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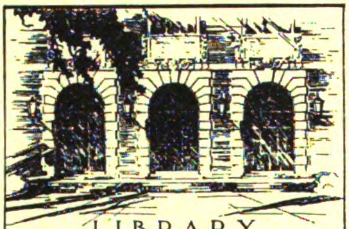

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NOTES

ON THE

GOVERNMENT SURVEYS

OF

THE PRINCIPAL COUNTRIES;

WITH

THE CIVIL AND MILITARY
DIVISIONS AND AREA OF EACH COUNTRY,
MEASURES OF LENGTH AND SURFACE, LISTS
OF GOVERNMENT MAPS, CONVENTIONAL SIGNS
AND ABBREVIATIONS EMPLOYED, AND USEFUL TABLES
FOR MAP READING; TO WHICH IS ADDED A LIST
OF COLONIAL AND EXTRA-CONTINENTAL
POSSESSIONS, AND A LIST OF
MAP AGENTS.

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INTRODUCTION.

THE grand survey of a country is usually made in the following order, viz., the Triangulation, the Topography, and the Cartography.

The primary triangulation depends on bases measured with the greatest accuracy attainable; on these a network of triangles is constructed, with sides varying from 10 to 100 miles in length. The positions of the vertices of several of the triangles are determined astronomically with extreme care, viz., their latitude, longitude, and the azimuth of the side of the triangle. The altitude of these points above the level of the sea is also determined trigonometrically or by levelling.

Each of these primary triangles forms the framework of a secondary triangulation, their area is cut up into smaller triangles which, when required, form the basis of a further subdivision called the tertiary triangulation. The vertices of the latter triangulation are the starting points for the work of the topographer.

With regard to the time required by the topographer for his survey, it is said in Austria that an experienced officer with two or more soldiers can survey, on a scale of $\frac{1}{25000}$, 140 to 190 sq. miles in six summer months, or about 1 sq. mile per diem, drawing the same in colours during the winter. This differs widely from Schiavoni, who states in his "Principii di Geodesia" that a topographer in six months can complete about 31¼ sq. miles on a scale of $\frac{1}{20000}$.

The difference of estimation may be partly explained by a greater precision being required in the latter case.

The manuscripts of the topographer in turn go to the cartographer, who reproduces them on the same scale, or reduces them for publication.

Line engraving on copper is a long and expensive process, and gives way to photo-lithography and photo-zincography when rapid work is required. The latter are distanced in their effect by heliography, which approaches the results by copper engraving. Heliography is largely employed in Austria, Italy, Russia, and other countries for reproducing works of art, maps, &c.

Military maps are mostly produced by zincography and zincotype. Beauty gives way to clearness, and to rapid and cheap work.

Printing in colours is much practised on the Continent; for example, the French Staff map of France $\frac{1}{80000}$, map of Holland

$\frac{1}{50000}$, map of Italy $\frac{1}{100000}$, the new map of Spain $\frac{1}{50000}$, &c. The advantage of colours in reading maps is recognised by all, especially for military maps, but the technical difficulties in the process of printing in colours are too great for general purposes; in time, however, they may be obviated. Another class of military maps has experienced a great development, in which the relief of the ground is not shown by hachures but by contours, either alone or covered by shading formed of line engraving or lithographic chalk; this method is more rapid, more precise and cheaper than the vertical hachure system.

Hypsometric maps in colours (Hanslab's method) have not developed to a like degree. As strategical maps, however, they are very clear and valuable.

In some foreign countries the tendency is apparent in cartography to adopt chromo-lithographed maps with contours, in the place of maps in black outline with the features represented by hachures.

GREAT BRITAIN AND IRELAND.

Introduction.

The Ordnance Survey of the United Kingdom is at the present time under the Board of Works, and is performed by officers and men of the Royal Engineers with civilian assistants.

The first trigonometrical survey may be said to have been commenced in 1784, by the measurement of a base line on Hounslow Heath, under the superintendence of General Roy, R.E. This served as a starting point for the triangulation of the S.E. counties, and became the basis of the great triangulation which was gradually extended over the whole of the British Isles and finished about the year 1853.

There are six bases measured in the United Kingdom, viz.:—

Place.	Length in feet.	Date.
Hounslow Heath	27406·19	1791
Salisbury Plain	36576·83 (1st measurement.)	1794
Do.	36577·858 (2nd measurement.)	1849
Misterton Carr (Lincolnshire)..	26344·06	1801
Rhuddlan Marsh (Flintshire)	24516·00	1806
Belhelvie (Aberdeenshire)	26517·53	1817
Lough Foyle	41640·887	1827

The mean length of the sides in the principal triangulation is 35·4 miles. There are 37 sides between 80 and 90 miles in length, 18 between 90 and 100 miles, 11 exceeding 100 miles, the longest side being 111 miles in length, viz., from Slieve-Donard to Sca Fell. The positions of about 250 points, in all parts of the country, have been determined with the greatest precision.

Soon after the year 1786 the Government decided on having a general survey of the entire Kingdom on the scale of 1″ to a mile for military purposes. In 1824 this survey, known as the 1″ old series, was completed in England and Wales up to the southern borders of Lancashire and Yorkshire.

At this time the survey of England was suspended, and that of Ireland commenced on a scale of 6″ to the mile as a basis for general land valuation purposes, and was finished in 1840. The sheets of about a quarter of this survey have been revised and published.

In 1840 the survey of England was resumed, and the scale of 6″ to the mile was adopted for the unsurveyed portions. In

1851 Yorkshire, Lancashire, the Isle of Lewis, and several counties in the south of Scotland were finished on the 6″ scale.

This was the state of the survey of the United Kingdom when the long controversy known as the "battle of the scales" commenced, and seriously retarded it for 11 or 12 years.

In 1851 the survey on the 6″ scale was stopped, and that on the 1″ reverted to; in 1852 the 6″ was ordered again. In 1853–4 the Director of the Survey was for 15 months without orders for any scale at all; in 1854 the scale of $\frac{1}{2500}$ was partially adopted. About this time the Statistical Conference held at Brussels, in considering the question of the scale for national maps or cadastres (viz., plans from which the area of land may be computed, and from which its revenue may be valued) decided unanimously in favour of a scale of $\frac{1}{2500}$, equivalent to 25·344 inches to a mile, and therefore commonly styled with us the 25″ scale.

In 1855 the Government sanctioned the adoption of this scale for the cultivated districts of the four northern counties of England and the unsurveyed parts of Scotland; of the 6″ scale for the uncultivated districts, and the 1″ military map for the whole Kingdom.

It was finally determined that the following surveys should be made or revised.

1. A topographical map of the whole of Great Britain and Ireland on the scale of 1″ to the mile.
2. County plans of the same countries on the scale of 6″ to the mile.
3. Parish plans on a scale of $\frac{1}{2500}$ of the same countries. (The County of Dublin is the only portion of Ireland surveyed on this scale at present.)
4. Plans on the scale of $\frac{1}{500}$ of all towns with more than 4,000 inhabitants, excepting London and environs, for which the scale of 5 ft. to a mile was selected.

Each sheet of the parish maps ($\frac{1}{2500}$) is equivalent to 960 acres, one sq. inch = 1 acre nearly.

Each sheet of the county maps ($\frac{1}{10560}$) is equivalent to 15,360 acres, or to 16 sheets of the parish maps.

The sheets of the 1″ scale (old series) were not constructed uniformly to one proper geometrical projection for the whole country. The S.E. counties were drawn with reference to the meridian of Greenwich, those of Dorset to that of Black Down, those of Devon and Cornwall to that of Butterton Hill. The sheets cannot therefore be fitted accurately together so as to form one complete map. This is, however, being remedied in the new series, one central meridian, viz., that of Delamere in Cheshire has been adopted for England and Wales, and the sheets of the six northern counties have all been completed with reference to it.

As the $\frac{1}{2500}$ survey progresses the remainder of England and Wales will be published on the 1″ scale (new series) on the same uniform system.

As soon as the survey on the $\frac{1}{2500}$ scale was commenced in 1855, that of the 6″ was abandoned. At first the reduction of maps from one scale to another was made by means of the pentagraph, but this gave place to the process by photography, it being found that the error of distortion produced by the lens was imperceptible and much within the limits of expansion and contraction of the paper under ordinary atmospheric changes. The 6″ maps are therefore prepared by photographic reduction from the $\frac{1}{2500}$ scale sheets. The former show the features of the ground by contours only, the latter have no contours marked.

The 1″ maps are reduced by the pentagraph, and are published in outline with contours only, and also with the hill features (vertical hachures) without the contours. The contours are marked at vertical distances of 5′, 10′, 25′, 50′, or 100′, according to circumstances, above the level of the sea. The scale being so much smaller than the 6″, many details have to be omitted in the 1″ for the sake of clearness, which renders the process of photography inapplicable.

The bench marks of the Ordnance Survey are calculated above mean high water level at Liverpool for England, Wales and Scotland, and above mean high water level at Poolbeg Lighthouse, Dublin, for Ireland.

The present methods of representing hill features are by contours alone (6″ county maps and 1″ general map, new series), by vertical hachures (1″ general map), by horizontal hachures (1″, 1½″, and 4″ specially prepared for military purposes), and by a combination of contours with horizontal or vertical hachures (6″ specially prepared for military purposes).

The contours on the $\frac{1}{10560}$ map do not show the minor features of the ground sufficiently for military purposes. In the new series, altitudes are marked in feet.

PRESENT STATE OF THE PUBLICATION OF THE MAPS AND PLANS OF THE ORDNANCE SURVEY.

England and Wales.

Scale $\frac{1}{2500}$, or 25·344 *inches to the mile* (Parish Map).—The four northern counties, Denbighshire, Flintshire, Cheshire, the Isle of Man, Glamorganshire, Hampshire, Isle or Wight, Middlesex, Kent, Surrey, Sussex, Essex, Hertfordshire, Berkshire, and parts of 22 other counties have been published.

Scale $\frac{1}{10560}$, *or* 6 *inches to the mile* (County Map).—The six northern counties, the Isle of Man, Flint and Denbigh, Middlesex, Hampshire, Isle of Wight, Surrey, Sussex, Kent, and parts of eight other counties have been published.

Scale $\frac{1}{10560}$, *or* 6 *inches to the mile* (Sketch Survey of the Hills to the south and south-west of London, generally known as the Surrey Hill Survey).—Parts of Kent, Surrey, Hants, Berks, Oxford, and Bucks, 58 sheets.

Scale $\frac{1}{63360}$, *or* 1 *inch to the mile* (old series).—All the counties are completed with hills and published, except the four northern counties and the northern halves of Yorkshire and Lancashire.

Scale $\frac{1}{63360}$, *or* 1 *inch to the mile* (new series).—Northumberland, Cumberland, Westmoreland, Durham, Isle of Man, the northern halves of Yorkshire and Lancashire and the Aldershot sheet have been published with hills, and also in outline with contours only; Kent, Surrey, Sussex, Isle of Wight, the greater part of Hampshire and of Middlesex, and portions of Wilts, Berks, Bucks and Essex in outline only.

Scales $\frac{1}{500}$, $\frac{1}{528}$, $\frac{1}{1056}$, $\frac{1}{2500}$, $\frac{1}{2640}$.—About 225 towns, including London, have been completed and published.

Scotland.[*]

Scale $\frac{1}{2500}$.—About $\frac{2}{3}$rds published, generally to the south and east.

Scale $\frac{1}{10560}$.—Nearly the whole published, the exception being Ross-shire and portions of the West Coast, Orkney and Shetland.

Scale $\frac{1}{63360}$.—The whole is published in outline and with hills with the exception of Caithness, part of Sutherland, part of Ross-shire, part of Inverness, and part of Argyllshire, which are completed in outline only, and with the exception of Orkney, Shetland, portion of the Western Isles, part of Ross, part of Inverness, and part of Argyll, the publication of which has not yet been commenced.

Scales $\frac{1}{500}$, $\frac{1}{528}$, $\frac{1}{1056}$, $\frac{1}{2500}$.—All the towns, 61 in number, have been completed.

Ireland.

Scale $\frac{1}{2500}$.—The county of Dublin only has been surveyed and published.

Scale $\frac{1}{10560}$.—The whole has been published, and about $\frac{1}{3}$rd (principally Ulster) has been revised and published.

Scale $\frac{1}{63360}$.—The whole has been published in outline, and the northern $\frac{2}{3}$rds of the country and a portion of the South and South-west Coast with hills also.

Scales $\frac{1}{500}$, $\frac{1}{1056}$, $\frac{1}{2500}$.—Plans have been published of all the principal towns in Ireland.

Geological Surveys.

Geological Surveys are performed by the Royal Geological Institution, established in 1835. The results of the original field survey are laid down upon the Ordnance 6 inch maps in those districts where maps of this scale are available; in other parts the 1 inch maps are used.

---

[*] The Survey of Scotland is completed.

Where the districts contain Coal-bearing strata or other mineral-bearing rocks of commercial importance requiring greater detailed information, the original 6 inch survey is engraved and published.

M.S. coloured copies of the country adjacent to the published 6 inch maps (not intended for publication) are deposited for reference in the Institution.

The 1 inch map constitutes the general geological map of the United Kingdom, and on this scale the whole will be published.

The present state of the 1 inch publication is as follows, viz.:—

Wales—All.

England—All except Suffolk, Norfolk, Cambridgeshire, Lincolnshire,. Isle of Man, part of Essex, and the greater portion of the northern counties.

Scotland—Of 116 sheets, 17 (portions of the southern counties) have been published.

Ireland—All except a portion of Ulster.

Civil Divisions.

England is divided into	..	40 counties.
Wales „ „ ..	..	12 „
Scotland „ „ ..	..	33 „
Ireland „ „ ..	..	4 provinces,
and again into ..	..	32 counties.

Military Divisions.

England, Scotland and the Channel Islands are divided into 12 military districts, which are sub-divided into 59 regimental districts.

Ireland has 3 military districts, sub-divided into 8 regimental districts.

Areas.

The area of England is	..	50,387 sq. miles.
„ Wales „	..	7,425 „
„ Scotland „	..	29,600 „
„ Ireland „	..	32,513 „
Total	..	119,925

MEASURES OF LENGTH AND SURFACE.

Measures of Length.

1° on the Equator (60 Geog. Miles).	Irish Mile.	League.	Statute Miles.	Furlongs.	Chains.	Irish Perches.	Poles or Perches.	Fathoms.	Yards.	Feet.	Links.	Inches.	Metric equivalents.	
													Metres m.	Kilometres km.
1	—	—	69·173	—	—	—	—	—	121744·6	365233·7	—	4382804	111321	111·321
	1	$\frac{14}{33}$	$1\frac{3}{11}$	$10\frac{2}{11}$	$101\frac{9}{11}$	320	$407\frac{3}{11}$	1120	2240	6720	$10181\frac{9}{11}$	80640	2048·219	2·048219
		1	3	24	240	$754\frac{2}{7}$	960	2640	5280	15840	—	—	—	—
			1	8	80	$251\frac{3}{7}$	320	880	1760	5280	8000	63360	1609·31492	1·60931492
				1	10	$31\frac{3}{7}$	40	110	220	660	1000	7920	201·164	·201164
					1	$3\frac{1}{7}$	4	11	22	66	100	792	20·1164	·0201164
						1	$1\frac{3}{11}$	$3\frac{1}{2}$	7	21	$31\frac{9}{11}$	252	6·400695	·0064006
							1	$2\frac{3}{4}$	$5\frac{1}{2}$	$16\frac{1}{2}$	25	198	5·029	·005029
								1	2	6	$9\frac{1}{11}$	72	1·8287	·001828
									1	3	$4\frac{6}{11}$	36	·91438	·00091438
										1	$1\frac{17}{33}$	12	·304795	·0003047
											1	7·92	—	—

NOTE.—A degree of the Meridian (mean) = 69·046 English stat. miles.
= 111·1167 kilometres.
A degree of the Equator = 69·173 English stat. miles.
= 111·321 kilometres.
A geographical mile = 1·1529 Eng. statute miles = 1 minute of Equator.

Measures of Surface.

Square Mile.	Hides of Land.	Irish Acres.	English Acres.	Square Chains.	Roods.	Square Perches (Irish).	Square Perches (English).	Square Yards.	Square Feet.	Square Inches.	Square Links.	Metric Equivalents.			
												Square Metres (m^2).	Ares or sq. decametres (a).	Hectares (ha).	Sq. Kilometres (km^2).
1	6·4	395·008	640	6400	2560	63232	102400	3097600	27868400	4014489600	64000000	2589894·4	25898·94	258·9894	2·5898
	1	61·72	100	1000	400	9880	16000	484000	4356000	627264000	10000000	404671·02	4046·7102	40·467102	·40467102
		1	1·62	16·2	6·48	160·056	259·2	7840·8	70567·2	10161676·8	161599	6555·6702	65·556702	·65556702	·0065556702
			1	10	4	98·8	160	4840	43560	6272640	100000	4046·71	40·4671	·404671	·00404671
				1	·4	9·88	16	484	4356	627264	10000	404·671	4·04671	·0404671	·000404671
					1	24·7	40	1210	10890	1568160	25000	1011·6775	10·116775	·10116775	·0010116775
						1	1·619	49	441	63504	1012·396	40·96841	·4096841	·004096841	·00004096841
							1	30·25	272·25	39204	625	25·291939	·25291939	·0025291939	·000025291939
								1	9	1296	20·66115	·836097	·00836097	·0000836097	·000000836097
									1	144	2·29	·0929	·000929	·00000929	·0000000929

ORDNANCE SURVEY MAPS OF GREAT BRITAIN AND IRELAND.

Description.	Scale.	No. of Sheets published	Remarks.
Plans of towns ..	$\frac{1}{500}$ $\frac{1}{528}$ $\frac{1}{1000}$ $\frac{1}{1056}$	..	Levels only are shown in these plans; those specially prepared for W.D. purposes show the fortifications, &c., as well as the levels.
Special maps	$\frac{1}{1760}$		
Do.	$\frac{1}{2376}$		
Parish maps	$\frac{1}{2500}$	..	Cadastral Survey—published without contours, except those sheets for W.D purposes, which have contours and fortifications.
Special maps	$\frac{1}{2640}$		
Do.	$\frac{1}{5280}$		
County maps	$\frac{1}{10560}$	..	Published with contours; those sheets for W.D. purposes have fortifications in addition.
Survey of the hills to the south and west of London (Surrey Hill Survey).	$\frac{1}{10560}$	52	Combination of contours and vertical hachures in brown.
Neighbourhood of Plymouth	$\frac{1}{10560}$	6	Ditto. Specially prepared for War Game.
Country round Aldershot..	$\frac{1}{10560}$	13	Combination of contours and horizontal hachures in black.
Country round Cork ..	$\frac{1}{10560}$	10	Horizontal hachures in black, no contours. Photozincographed from Field sketches.
Indexes	$\frac{1}{12672}$		
Special maps	$\frac{1}{15840}$		
Curragh of Kildare ..	$\frac{1}{15840}$	1	Horizontal hachures.
Indexes	$\frac{1}{21120}$		
Aldershot and environs ..	$\frac{1}{21120}$	2	In outline, with contours only.
Special maps	$\frac{1}{31680}$		
Aldershot	$\frac{1}{42240}$	1	Horizontal hachures in black.
General map of the United Kingdom—			
a. Old series ..	$\frac{1}{63360}$	110	Published with hills, vertical hachures.
b. New series ..		..	Published in outline with contours, and with hills (vertical hachures) without contours.
Aldershot	$\frac{1}{63360}$	1	Horizontal hachures in black.
Lake district of Cumberland and Westmoreland.	$\frac{1}{63360}$	9	With shaded contours, representing the plan of a cardboard model.
Special maps	$\frac{1}{253440}$		

Description.	Scale.	No. of Sheets published.	Remarks.
England and Wales	$\frac{1}{253440}$	8 (incomplete).	This is a reduction from the 1″ old series, and is unfinished and incomplete.
Special maps	$\frac{1}{316800}$		
Indexes	$\frac{1}{633600}$		
Special maps	$\frac{1}{1900800}$		

Conventional Signs on the English Ordnance Survey Maps, $\frac{1}{10560}$ and $\frac{1}{63360}$. (*See* Plate I.)

1. Causeway or raised road.
2. Sunk or hollow road.
3. Canal and tunnel.
4. Embankment or dyke.
5. Parks and ornamental grounds.
6. Orchard.
7. Garden.
8. Deciduous woods.
9. Coniferous woods.
10. Rocky heathy pasture.
11. Furze or whins.
12. Ditto ditto with rocks and trees.
13. Marshes.
14. Rough or heathy pasture.
15. Bog or moss.
16. Instrumental horizontal contour lines, the dot representing the position of the contour staff fixed by the instrument, and the small circle shows where a contour picket has been left in the ground.
17. Interpolated contour lines.
18. Superintendent Registrar's district boundary.
19. Registrar's district boundary.
20. Railway, double line.
21. Railway, single line.
22. Bleaching grounds, *coloured green.*
23. Smithy.
24. Limekilns.
25. Iron works.
26. Glass works.
27. Tanneries.
28. Marl pits.
29. Gravel pits.
30. Quarries.
31. Forts.
32. Wells.
33. Brick fields.
34. Tenter grounds.

35. Alum works.
36. Turnpike and main road (1) fenced (2) unfenced.
37. Cross road (1) fenced (2) unfenced.
38. Tram roads.
38*a*.Footpath.
39. Canals; distinguished from roads by the parallelism of the sides and by the locks and bridges, the side next to the light is shaded as in rivers. Canals and navigable rivers are *coloured blue.*
40. Windmill of stone.
41. Windmill of wood.
42. River, with bridges.
43. River, with ford.
44. River, with ferry.
45. River, with fish weir.
46. Mercury mine; applicable only to the Geological Survey.
47. Copper ditto ditto ditto
48. Lead ditto ditto ditto
49. Silver ditto ditto ditto
50. Gold ditto ditto ditto
51. Iron ditto ditto ditto
52. Tin ditto ditto ditto
53. Coal ditto ditto ditto
54. Chapel.
55. Public house.
56. Posting house.
57. Trigonometrical point.

Boundaries of—

58. Counties.
59. County divisions and ridings.
60. Baronies, hundreds, wapentakes, wards.
61. Parishes.
62. Townlands, townships.
63. Counties and baronies or hundreds.
64. Counties and parishes.
65. Counties and townlands or townships.
66. Baronies or hundreds and parishes.
67. Baronies or hundreds and townlands or townships.
68. Parishes and townlands or townships.
69. Counties, baronies or hundreds and parishes.
70. Counties, parishes, and townlands or townships.
71. Counties, baronies or hundreds, and townlands or townships.
72. Baronies or hundreds, parishes, and townlands or townships.
73. Counties, baronies or hundreds, parishes, and townlands or townships.
74. Divisions of townships.
75. Sub-divisions of townships.
76. Parliamentary, written to the boundary.
77. Municipal, ditto

78. Liberties, honours, &c.
79. Wards of corporate towns.
80. Where boundary changes sides.

Altitudes are above the mean level of the sea at Liverpool.

The contour altitudes are written thus, 200; all other altitudes along roads and to trigonometrical stations obtained by spirit levelling are written thus, *300* . the dot showing the spot whose altitude is given.

The altitudes with the letters B.M. marked ⩚ refer to bench marks made on buildings, walls, milestones, &c.

The altitudes at the trigonometrical stations are given of the surface of the ground, and also of the upper side of the centre stone marking the station.

Abbreviations.

M.S.	Milestone.
M.P.	Mile post.
L.P.	Lamp post.
M.H.	Man hole.
G.P.	Gas plug.
W.P.	Water plug.
F.P.	Fire plug.
L.	Lamp.
S.P.	Signal post.
B.M.	Bench mark.
B.S.	Boundary stone.
C.S.	with boundary, denotes that it runs along *centre of stream.*
C.R.	Ditto ditto ditto *centre of road.*
S.S.	Ditto ditto ditto *side of stream.*
S.D.	Ditto ditto ditto *side of drain.*
R.H.	Ditto ditto ditto *root of hedge, face of cop, side of fence.*
F.W.	Ditto ditto ditto *face of wall.*
C.F.	Ditto ditto ditto *centre of fence.*
T.C.	Ditto ditto ditto *top of cop.*
C.W.	Ditto dltto ditto *centre of wall.*
Def. T.S. Und.	Defaced or undefined track of stream, drain or fence.

CONVENTIONAL SIGNS AND TERMS USED IN MILITARY TOPOGRAPHY (ENGLISH). (*See* Plate II.)

Troops, &c.

1. *a.* Battery of field artillery (scale 6″=1 mile).
   b. Ditto ditto (scale 3″=1 mile).
2. *a.* Battalion of infantry in column (500 men in 6 companies) (scale 6″=1 mile),

b. Battalion of infantry in column (scale 3″=1 mile).
c. Ditto in line (scale 6″=1 mile).
d. Ditto ditto (scale 3″=1 mile).
3. *a.* Regiment of cavalry in column (500 men in 4 squadrons) (scale 6″=1 mile).
b. Regiment of cavalry in column (scale 3″=1 mile).
c. Ditto in line (scale 6″=1 mile).
d. Ditto ditto (scale 3″=1 mile).
4. Picquet.
5. Support.
6. Sentry.
7. Double sentry.
8. Vedette.
9. Double vedette.

Day sentries, vedettes and patrols, *coloured red*; night ditto, *uncoloured.*

10. Direction of a patrol.
11. Baggage.
12. Clearances or demolitions.
13. Entanglements or abattis.
14. Intrenchments.
15. Rifle pits.
16. Battery.
17. Site of battle.

Lines of Communication and Rivers.

18. Road enclosed by fence, ditch, or other obstacle.
a. Embankment.
b. Cutting.
19. Road without fence, &c.
20. Footpath.

The nature of the roads, whether metalled, unmetalled, &c., should be written along them when necessary.

21. *a.* Railway, single line—*col. red.*
b. Ditto, double line—*col. red, transverse touches in black.*
c. Embankment.
d. Tunnel.
e. Cutting.
22. Canal.
a. Lock.
23. Telegraph.
24. *a.* Lake.
b. Ford.
c. Ferry.
d. Direction of current.
e. Bridge, the material to be indicated by the words, iron, stone, brick, wood, boats, &c.
f. Flying bridge.
g. Cliffs.
h. Pier and lighthouse.
i. Anchorage.

Water should invariably be represented either by a wash of *blue* or by *blue* chalk pencil lines.

25. Character of names of important cities, titles of plans, &c.
26. Character of all other printing.

Details, &c.

27. Marsh (with a few horizontal *blue* touches).
28. Woods or single trees (descriptions in writing).
29. *a.* Fields having hedgerows with and without trees (scale 6″=1 mile).
    b. Ditto (scale 3″=1 mile).
30. Fence, bank, or wall.
31. Nullahs (India).
32. *a.* Church or chapel (scale 6″=1 mile).
    b. Ditto (scale 3″=1 mile).
33. *a.* Other buildings and gardens (scale 6″=1 mile).
    b. Ditto ditto (scale 3″=1 mile).
34. Compass point.

The following Tints should be used when possible.

Woods.—Light shade of *green* (Hooker's No. 2).
Cultivation.—*Light shade of gamboge.*
Main roads.—*Burnt Sienna.*
Masonry—*Crimson lake.*
Wooden building.—*Black.*
British troops.—*Crimson lake.*
Opposing force.—*Blue.*

When the same troops are shown in successive positions, different shades of the same colour should be used.

AUSTRO-HUNGARY.

Introduction.

The Topographical Survey of Austria is executed and published by the Imperial Military Geographical Institute at Vienna; it is under the War Department through the chief of the Staff, and is presided over by a general officer. The surveys are performed by officers assisted by soldiers.

When the triangulation is completed the topographical military surveys are first plotted on a scale of $\frac{1}{25000}$ except for large cities, &c., manœuvring and camping grounds, which are on the scale of $\frac{1}{12500}$. They are executed in the summer from May to October, and reproduced or reduced from cadastral surveys in the winter.

Main contour lines are at vertical distances of 100 metres, intermediate contour lines 20 metres, and auxiliary contour lines 10 metres, and are coloured red-brown (brown madder).

In Lehmann's method hill features are shown by vertical hachures in black, according to the established scale of shade.

Geological Surveys.

Austrian Geological Government Surveys are executed by the Imperial and Royal Geological Institute, established in 1849. A Geological Institute for Hungary has been established at Pesth.

Civil Divisions.

The empire is divided into nineteen provinces, of which 14 are Cisleithan, or German, and 5 Transleithan, or Hungarian. The provinces are subdivided into counties, or komitats, in Hungary and Transylvania; into quarters, or viertels, in Lower Austria; and into circles, or kreis, elsewhere. There is also a further subdivision into communes, or gemeinde.

Military Divisions.

The military divisions consist of 13 general and military commands, which are divided into 102 Regimental Districts (Bezirke).

Area.

The area of Austro-Hungary is as follows:—

Cisleithan, or German	115,919	sq. miles.
Transleithan, or Hungarian ..	124,402	„
Total	240,321	

Measures of Length and Surface in Austro-Hungary.

The French metric system was introduced by the law of 23rd July, 1871: it was permissive from 1st January, 1873, and compulsory from 1st January, 1876.

Comparison of Old and New Measures of Length.

Old Measure.								New Measure.		English Equivalents.			
Post Mile.	Klafter.	Elle.	Fuss.	Faust (hand).	Zoll.	Linie.	Punkt.	Metres m.	Kilometres km.	Inches.	Feet.	Yards.	Miles.
1	4000	9756	24000	72000	288000	3456000	41472000	7585·936	7·585936	298092	24891	8297	4·71376
	1	2·439	6	18	72	864	10368	1·896484	·001896484	74·66598	6·2226	2·0742	·001178
		1	2·46	7·38	29·52	35424	425088	·777558	·000777558	30·61307	2·55109	·85036	·000483
			1	3	12	144	1728	·316081	·000316081	12·4452	1·0371	·3457	·000196
				1	4	48	576	·1053602	·0001053602	4·14811	·3457	·1152	·000065
					1	12	144	·2634	·0002634	1·0371	·086425	·028808	·000016
						1	12	·2195	·0002195	·0864	·0072	·0024	·0000013
							1	·183	·000183	·0072	·0006	·0002	·0000001

NOTE—The Austrian geographical mile = the German geographical mile = 4·603 English statute miles = 4 minutes of meridian (mean) or 4 English mean nautical miles.

Comparison of Old and New Measures of Surface.

Old Measure.				New Measure.			English Equivalents.			
Square Post Mile.	Joch.	Square Klafter.	Square Fuss.	Square Metre (m^2)	Ar (a.)	Hektar (ha.)	Square Feet.	Square Yards.	Acres.	Square Miles.
1	10000	16000000	576000000	57546432	575464·32	5754·6432	619545600	68838400	14222·8	22·2
	1	1600	57600	5754·6432	57·546432	·57546432	61954·56	6883·84	1·42228	·00222
		1	36	3·596652	·03596652	·000359665	38·7216	4·3023	·000888	·00000139
			1	·09907	·0009907	·000009907	1·0756	·1195	·0000246	·00000004

The general surface measures are the squares of the measures of length.

GOVERNMENT MAPS OF AUSTRO-HUNGARY.

(Longitude is reckoned from Ferro Island (Canaries) which is 18° 9′ W. of Greenwich).

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Cadastral Survey ..	$\frac{1}{2880}$	..	..	.. ..	Not published.
Special map of Austro - Hungary (Aust. Staff Map).	$\frac{1}{75000}$	1875 in hand.	390 at close of 1881.	Military Geographical Institute of Vienna.	Heliographic. To be completed in 715 sheets (1885 ?).
"Uebersichts-Karte" of Austro-Hungary.	$\frac{1}{750000}$	1882	30	ditto	Printed in 4 colours. Completed.
Geological maps of different provinces.	..	..	..	Minister of Agriculture.	
Dypsometric map of Austro-Hungary.	..	..	..	Minister of Public Instruction.	

The following maps are being gradually absorbed by the special map of Austro-Hungary $\frac{1}{75000}$.

Austria above and below the Ems.	$\frac{1}{144000}$	1812 to 1823	31	Military Geographical Institute of Vienna.	Copper engraved.
Ditto	$\frac{1}{288000}$	1843	2	ditto	ditto.
Austro - Hungary (Central Europe).	$\frac{1}{300000}$	1873 to 1876	72	ditto	Amplification of Scheda's map $\frac{1}{576000}$ and extended to the whole of Central Europe.
Austro-Hungary ..	$\frac{1}{300000}$	1877	56	ditto	Road map without hills; one sheet gives environs of Vienna $\frac{1}{150000}$.
Special map of Bohemia.	$\frac{1}{144000}$	1847 to 1860	39	ditto	Copper engraved.
Bohemia	$\frac{1}{288000}$	1865	4	ditto	ditto.
Ditto	$\frac{1}{288000}$	1865	4	ditto	Copper engraved, road map without hills.
Boukovina and Galicia.	$\frac{1}{288000}$	1868	11	ditto	Copper engraved.
Croatia, Slavonia, &c.	$\frac{1}{144000}$	1834 to 1841	37	ditto.	ditto.
Ditto	$\frac{1}{288000}$	1869	7	ditto	Copper engraved, road map without hills.
Dalmatia	$\frac{1}{144000}$	1861 to 1863	21	ditto	Copper engraved.
Special map of Hungary with Siebenbürgen, Croatia, Slavonia.	$\frac{1}{144000}$	1869 in hand.	133 at end of 1879.	ditto	Copper engraved. To be completed in 198 sheets.
Illyria and Styria ..	$\frac{1}{144000}$	1834 to 1842	36	ditto	Copper engraved.
Illyria	$\frac{1}{288000}$	1843	4	ditto	ditto.

Name of map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Moravia and Silesia	$\frac{1}{144000}$	1844	19	Military Geographical Institute of Vienna.	Copper engraved.
Ditto	$\frac{1}{288000}$	1846	4	ditto	ditto.
Salzbourg	$\frac{1}{144000}$	1810	13	ditto	ditto.
Ditto	$\frac{1}{288000}$	1810	1	ditto	ditto.
Styria	$\frac{1}{144000}$	1834	37	ditto	ditto.
Ditto	$\frac{1}{288000}$	1842	4	ditto	ditto.
Tyrol, Voralberg, &c.	$\frac{1}{144000}$	1825 to 1838	24	ditto	ditto.
Neighbourhood of Vienna.	$\frac{1}{12500}$	1878	48	ditto	Contours 10 m. apart with hachures, coloured.
Railway map ..	$\frac{1}{1000000}$	1881	6	Minister of Commerce.	.. ..

CONVENTIONAL SIGNS FOR MILITARY MAPS (TOPOGRAPHICAL) OF THE AUSTRO-HUNGARIAN MONARCHY ON DOUBLE SCALE, $\frac{1}{12500}$; SINGLE SCALE, $\frac{1}{25000}$;* AND FOR THE SHEETS OF THE SPECIAL MAP, $\frac{1}{75000}$. (*See* Plate III.)

1. Bench marks—*in col. pl. red.*†
2. Trigonometrical altitudes—*in col. pl. red.*
3. Calculated points—*in col. pl. red.*
4. (1.) Church with one tower, when a trigonometrical point.
   (2.) Ditto, only used in the special map.
5. (1.) Church with two towers, when a trigonometrical point—*in col. pl. red.*
   (2.) Ditto, only used in the special map.
   The absolute height in metres is shown in 1, 2, 4, and 5 by upright Arabian figures, and in 3 by sloping ones.

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* Generally called plans.

† In coloured plans (col. pl.) objects of wood, some communications, cultivation and political boundaries, with some conventional signs, are *black*.

Dwelling-houses, stone objects, and high roads—*Red* (*crimson lake*). Water—*Prussian blue*.

Pasturage, meadowland, gardens—*Green*.

Vineyards—*Yellow-red* (*orange*).

Underwood—*Yellow-grey*.

Woods—*Grey*.

Important carriage roads, mule paths, footpaths—*Chrome-yellow*.

Rocks—*Sepia*.

Glaciers—*Neutral tint*.

Lines of contouring—*Red-brown* (*brown madder*), or, shown in rocky portions or glaciers, by *Venetian-red*.

The altitudes are marked on the objects concerned on iron plates: if bridges, on the road level; if railways, on the rails; if still water, at the normal water level; if any other object, on the natural surface of the ground. Altitudes added to names of places are marked on the church of the place, denoted by figs. 4 or 5.

6. With "B" in the middle denotes district (Bezirk).*
Ditto "K" ditto ditto (Komitat)*
7. Posting station with conveyance for man (in plans).*
8. Ditto, ditto (in special map).*
9. Ditto, without ditto (in both).*
10. Horse-changing stations (in plans).*
11. Ditto ditto (in special map).*
12. Telegraph station.*
13. Waterless locality.*
14. Isolated mineral water.*
15. Ditto well.*
16. Ditto cistern.*
17. Country well.*
18. Permanent fresh water spring—*in col. pl. pale blue, picked out with sap blue.*
19. Quarry.
20. Mine.
21. Smelting furnace—*in col. pl. red; smoke, black.*
22. Brick kiln—*in col. pl. small ring, red.*
23. Lime kiln—*in col. pl. small ring, red.*
24. Monument—*in col. pl. red.*
25. Herdsman's hut, with inn—*in col. pl., if of stone, red.*
26. Cross—*in col. pl., if of stone, red.*
27. Shrine—*in col. pl., if of stone, red.*
28. Tree shrine.
29. Chapel—*in col. pl., if of stone, red.*
30. Church, without or with 1 tower—*in col. pl. red.*
31. Church, with 2 towers—*in col. pl. red.*
32. Dwelling house—*in col. pl. red.*
33. Inns—*in col. pl., if of wood, black; if of stone, black with red boundary walls.*
34. Block of houses—*in col. pl. red.*
35. Isolated factory—*in col. pl. red; smoke, black.*†
36. Cloister—*in col. pl. red.*
37. Castle—*in col. pl. red.*
38. Castle, in some sheets of the special map.
39. Farm—*in col. pl., as in No.* 33.
40. Isolated inn—*in col. pl. red; flag, black.*
41. Isolated forester's lodge—*in col. pl. red; horns, black.*
42. Ruins—*in col. pl. red.*
43. Ruins, in some sheets of the special map.

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* When standing by names.

† Isolated factories, mills, mines and quarries, are denoted according to their object or the material worked; for example, paper factory, coal mine, granite quarry.

44. Churchyards.
45. Loam pits.
46. Gravel pits.
47. Brick works.
48. Steam grain mills—*in col. pl. carmine; smoke, black.*
49. Water flour mill.
50. Wind flour mill—*in col. pl., if of stone, red.*
51. Tread flour mill.
52. Floating mill.
53. Saw mill.
54. Powder mill.
55. Lighthouse—*in col. pl. red.*
56. Chief war harbour.
57. War harbour.
58. Mercantile harbour.
59. Anchorage.
60. Dock for men of war.
61. Dock for merchantmen.
62. Steam navigation station.
63. Landing place for sailing ships.
64. Landing place for rowing boats.
65. Boundary mark, of wood or of stone in the special map, of wood in plans.
66. Stone boundary mark in plans—*in col. pl. red.*
67. Boundary hillock. Heap.
68. Boundary trees.
69. Prominent trees.
70. Ordinary trees.
71. Monarchy boundary.
72. Land boundary.
73. Bezirkshauptmannschaft, or Komitat boundary.
74. Gemeinde (commune) boundary.
75. Railway watering station (in plans).
76. Ditto ditto, and station without water supply (in special map).
77. Railway stopping place (in plans and special map).
78. Ditto guard house (in plans).
79. Ditto ditto (in special map).
80. Always stands at the ticket offices of railway stations.
81. Railway, double line (in plans).*
82. Ditto, single line, but track for double (in plans).*
83. Ditto single line (in plans).*
84. Horse tramway (in plans).*
85. Railway, double line, in course of construction.
86. Ditto, single line, in course of construction, track for two lines.
87. Ditto, ditto, in course of construction.
88. Horse tramway, in course of construction.
89. Railway culvert bridge—*in col. pl. red.*

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* These signs are one-third smaller in the special map.

90. Railway viaduct—*in col. pl. red.*
91. Stone gallery—*in col. pl. red.*
92. Tunnel.
93. Railway bridge with continuous track—*in col. pl. red.*
94. Ditto with open track—*in col. pl. red.*
95. Railway culvert bridge with continuous track—*in col. pl. red.*
96. Ditto ditto with open track—*in col. pl. red.*
97. Chausée 1st class, at least 16½ feet carriage way—*in col. pl. red.*
98. Ditto 2nd class, from 7½ ft. to 16½ ft. carriage way—*in col. pl. red.*
99. Ditto 3rd class, less than 7½ ft. carriage way—*in col. pl. red.*

With strong foundations, or on naturally firm ground, passable at all seasons of the year.

Signs ⅓rd smaller in special map than in plans.

By carriage way is meant only that metalled portion of the road which lies between the balustrades, guard stones, curb stones, or gravel heaps, and can actually be used by military wheeled transport.

100. Road in course of construction.
101. High road at least 7½ ft. broad.*
102. Country road, 1st class, at least 7½ ft. broad.*
103. Ditto, 2nd class, less than 7½ ft. broad.*
104. Mule path.*
105. Foot path.*
106. Shunting place (increased width of road), less than 500 paces long—*in col. pl. red.*
107. Contraction of road, less than 500 paces long—*in col. pl. red.*
108. Road with parapet walls—*in col. pl. red.*
109. Ditto with retaining walls—*in col. pl. red.*
110. Steep incline. This is used when the wheeled transport of an army with the ordinary teams could not pass.
111. Hollow ways.
112. Embanked communication.
113. Earth or facine causeway.
114. Causeway, walled on one side—*in col. pl., the wall red.*
115. Causeway, walled on both sides—*in col. pl. red.*
116. Dry ditch (ravine).
117. Wet ditch, with natural banks—*in col. pl., water line blue.*
118. Ditto embanked—*in col. pl., water line blue.*

In causeways and ditches, the relative heights (+) and depths (—) are given in metres.

119. Hedge (quick or wattled).
120. Wooden railing—*in col. pl., stone piers red.*
121. Wall, with or without piers—*in col. pl. red.*

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* In col. pl. chrome yellow, when they are the chief lines of communication between localities, valleys, &c.

122. Stone fence—*in col. pl. red.*
123. Fordable brook—*in col. pl. blue.*
124. Torrent—*in col. pl., the water line blue, the bed free of water, with dots.*
125. Unfordable brook—*in col. pl. light blue, banks dark blue.*
126. Fordable wet ditch—*in col. pl. blue.*
127. Unfordable wet ditch—*in col. pl. blue.*
128. Water conduit of wood—*in col. pl. the centre line, water line, blue.*
129. Water conduit with path on one side—*in col. pl. the centre line, water line, blue.*
130. Subterranean water conduit—*in col. pl. the centre line, water line, blue.*
131. Water conduit of stone—*in col. pl. the centre line, water line, blue; banks red.*
    (1.) Reservoir—*in col. pl. red.*
132. Masonry canal--*in col. pl., water light blue, edges red.*
133. Canal, lined with wood—*in col. pl., water light blue, edges black.*
134. Unlined canal (through the soil)—*in col. pl., water light blue, edges dark blue.*
135. Aqueduct—*in col. pl. red.*
136. Waterfall—*in col. pl. blue.*
137. Wooden water grate.
138. Weir of wood.
139. Weir of stone (in plans)—*in col. pl., the line red.*
140. Weir of stone (in the special map).
141. Sluice—*in col. pl., when of stone, red.*
142. Ford for carriages.
143. Ditto horses.
144. Ditto persons.
145. Bridge of boats, raft, floating bridges generally.
146. Bridge of wood, or with wooden substructure.
147. Bridge of wood, with stone piers—*in col. pl., the piers red.*
148. Bridge of stone or iron—*in col. pl. red.*
149. Navigable for rafts.
150. Navigable for rowing boats, down stream.
151. Ditto ditto up and down stream.
152. Ferry for carriages.
153. Ditto horses.
154. Ditto passengers.
155. Ferry by steamboat.
156. Ditto steam ferry boat.
157. Flying bridge.
158. Regular steamboat navigation.
159. Direction of current.
160. Jetty, built on wood.
161. Jetty, built on stone, *in col. pl. red.*
162. Bank, lined with wood.
163. Ditto stone (in plans), *in col. pl. red.*

164. Bank lined with stone (in special map).
165. Foot bridge.
166. Bridle bridge.
167. Bridge (carriage way sufficient for 1 wagon only).
168. Ditto ditto 2 wagons abreast.
169. Culvert bridge for 1 wagon, as in 167.
170. Ditto 2 wagons abreast.

Carriage way of 7½ feet is taken to be necessary for 1 wagon. No sign is used when the width is less than this. These so-called conventional signs for "Fit for Passage" are also placed at the entrance of places.

171. Rocks—*in col. pl., wash of sepia.*
172. Glaciers—*in col. pl., washes of Indian ink and ultramarine.*
173. Shingle, morain—*in col. pl. brown.*
174. Sandy tracts.
175. Swamp, marshy ground—*in col. pl., blue water lines.*
176. Reeds.
177. Wet soil—*in col. pl., blue water lines.*
178. Peat.
179. Puddles, holes, ponds, lakes—*in col. pl., area light blue, edges dark blue.*
180. Meadow land and pasturage—*in col. pl., the black marks are left out, and a wash of light blue-green with a fine black bounding line substituted; besides this, in considerable meadowland tracts "W" (Meadowland), and "H" (pasturage) are marked in convenient places.*
181. Arable land; in Plans the contour is a continuous black line.
182. Rice fields—*in col. pl., the strokes blue bounded by a continuous fine black line.*
183. Vineyards—*in col. pl., the area, instead of this sign, is dotted with vineyard colour, viz., yellow-red (orange). Vineyards with tillage are represented by orange strokes. The boundary is a continuous fine black line.*
184. Hop gardens—, *in col. pl., bounded by a continuous fine black line.*
185. Vegetable gardens—*in col. pl., instead of the engraving, the area is filled with garden colour, viz., dark blue-green, bounded by a continuous fine black line.*
186. Orchards—*in col. pl., like* 185, *with signs of trees added.*
187. Underwood—*in col. pl. the area is filled with yellow-grey, instead of the black signs. The boundary is a broad grey line.*
188. Wood (with felled drives).—*in col. pl., the area is filled with wood colour, viz., grey, instead of the black signs. The boundary is a broad grey line.*
189. Preserves—*in col. pl., as area of woods, v. No.* 188.
190. Village. The hill features are shown by hachures and by equidistant horizontal contours.

191. Chief contour lines (in plans)—*in col. pl., they are coloured red-brown (brown-madder), but where rocks and glaciers are shown they are coloured vermilion.*
192. Intermediate contour lines (in plans)—*ditto ditto.*
193. Auxiliary ditto (ditto) *ditto ditto.*

Scale.	Chief Contour Lines.	Intermediate.	Auxiliary.
	Vertical Distances in Metres.		
$\frac{1}{12500}$	50	10	5
$\frac{1}{25000}$	100	20	10

194. Contour lines, 100m. vertical interval (in special map).
195. Ditto 50m. ditto (ditto).

CONVENTIONAL SIGNS FOR MILITARY WORKS, TROOPS, AND ESTABLISHMENTS ESTABLISHED IN 1875 (IN AUSTRIA). (*See* Plate IV.)

1. Trench without ditch in front (shelter trenches and trenches).
2. Trench with ditch in front.
3. Intrenchment with obstacles (for guns).
4. Abandoned but still serviceable field works.
5. Entanglement of trees.
6. Palisades.
7. Field or siege battery.
8. Mortar battery.
9. Detached wall with embrasures.
10. Detached wall with loopholes.
11. Blockhouse.
12. Sign for the smaller masonry works in fortifications, which cannot be given in plan (traverses (Sperren) batteries, towers).
13. Retaining wall.
    1. On both sides of the ditch.
    2. Only on the counterscarp.
14. Simple trace.
15. Polygonal trace.
16. Bastion trace.
17. Detached fort.
18. Infantry in deployed line.
19. Infantry in line of columns, deploying intervals.
20. Infantry in close column.
21. Infantry group of skirmishers, patrol, outlying picquet.

22. Infantry skirmisher.
23. Cavalry in deployed line.
24. Cavalry in line of columns, deploying intervals.
25. Cavalry in close column.
26. Cavalry group of skirmishers, patrol, outlying picquet.
27. Cavalry skirmisher.
28. Artillery in deployed line.
29. Artillery in line of columns, deploying intervals.
30. Artillery gun.
31. Engineer company.
32. Pioneer company.
33. Medical 1st help station.
34. Medical dressing station.
35. Infantry brigade head quarters.
36. Cavalry brigade head quarters.
37. Divisional infantry head quarters.
38. Divisional cavalry head quarters.
39. Army corps head quarters (army intendance).
40. Army head quarters (army intendance).
41. Divisional artillery.
42. Divisional ammunition park.
43. Divisional hospital.
44. Supply column.
45. Field post.
46. Army corps gun reserve.
47. Army gun reserve.
48. Army corps ammunition park.
49. Army ammunition park.
50. Field hospital.
51. Hospital field depôt.
52. Supply magazine.
53. Field bakery.
54. Clothing field depôt.
55. Field post authorities.
56. Chief field post office.
57. Tool column.
58. Army tool park.
59. Bridge train.
60. Veterinary depôt.
61. Divisional fighting train.
62. Army corps baggage train.
63. Army head quarters supply train.
64. United baggage train of an army corps.
65. United supply train of an army corps.
66. United train of an army corps.
67. Field electric telegraph station.
68. Field heliographic, or signal station.
69. Ordnance letter post.
70. Line to show the tactical cohesion.
71. Line of movement (an arrow shows the direction).
72. Ordnance corps letter lines.

73. Company officer.
74. Battalion (and divisional) staff and train C. O.
75. Regimental staff.
76. Infantry ammunition wagon.
77. Covered (baggage) wagon.
78. Marketing wagon.
79. Meat wagon.
80. Provision wagon.
81. Gun carriage.
82. Ammunition wagon.
83. Requisition wagon.
84. Post wagon.
85. Carriage for persons.
86. Country wagon.

Abbreviations.

A.C.M.P.	Army Corps Ammunition Park.
A.M.P.	Army Ammunition Park.
A.M.R.P.	Army Reserve Ammunition Park.
A.M.F.D.	Army Ammunition Field Depôt.
A.C.T.P.	Army Corps Train Park.
A.Sz.P.	Army Tool Park.
A.T.P.	Army Train Park.
A.T.F.D.	Army Train Field Depôt.
B.C.	Head Qrs. of Brigade.
Bl.T.C. des d R.O.	Wounded Transport Column of the Order of Knights.
Bag.T.	Baggage Train.
B.G.P.	Engineer Siege Park.
B.A.P.	Artillery Siege Park.
D.C.	Head-Qrs. of Division.
D.M.P.	Divisional Ammunition Park.
D.f.m.Pf.	Veterinary Depôt.
Et.u.K.H.St.	Etappen and Sick Halting Place.
E.S.Z.	Medical Railway Train.
Et.M.	Etappen Magazine.
F.Sp.	Field Hospital.
F.M.H.	Field Veterinary Establishment.
F.V.M.	Field Supply Magazine.
Gef.T.	Fighting Train.
G.H.P.	Chief Engineer Park.
H.P.	Medical 1st Help Station.
H.F.D.f.Art.	Chief Artillery Field Depôt.
K.H.St.	Halting Place for the Sick.
M.W.	Ammunition Wagon.
M.F.D.	Hospital Field Depôt.
M.u.S.M.F.D.	Clothing and Medical Matériel Field Depôt.
Prov.C.	Provision Column.

R. Vpfl. M. u. Sch. E.D.	Reserve Supply Magazine and Slaughter House.
S.Mat. R.	Medical Matériel Reserve.
St. K.H.A. od. G.Sp.	Permanent Military Medical Establishment, or Garrison Hospital.
Verb. P.	Medical Dressing Station.
V.H.D.	Chief Supply Depôt.
Verpfl. C.	Supply Column.

BELGIUM.

Topographical maps are published by the Dépôt de la Guerre at Brussels.

The Department of Public Works has executed a model of ground on the road map $\frac{1}{160000}$. Vertical scale eight times the horizontal.

Maps are cheap, as line engraving on copper is not practised.

Geological Surveys.

Geological maps are published by the Minister of the Interior.

Civil Divisions.

Belgium is divided into 9 provinces (administrative), subdivided into arrondissements (administrative and judicial), again into cantons (military and judicial), and finally, into 2,582 communes.

Military Divisions.

There are two Military Districts (Lt.-General). Each of the 9 provinces also constitutes a military command (Maj.-General).

Area, 11,373 square miles.

Measures of length and surface are the same as in France (see France). Aune = Metre.

COMPARISON OF OLD AND NEW MEASURE.

	Old Measure.		New Measure.		English Equivalents.	
Degree of the Meridian (Mean).	Meile or League (French Lieu Marine).	Old Meile (French Mille).	Metres or Aunes.	Kilometres.	Yards.	Miles.
1	20	57	111116·7	111·1167	121521·6	69·046
	1	2·85	5555·5	5·555	6076·8	3·4523
		1	1949·2	1·9492	2131·6	1·214

Note.—$\dfrac{1^\circ \text{ of the equator}}{1^\circ \text{ of the meridian (Mean)}} = \dfrac{69\cdot173}{69\cdot046}$ statute miles.

GOVERNMENT MAPS OF BELGIUM.

(*Longitude is reckoned from Brussels, which is 4° 22′ East of Greenwich.*)

Name of Map.	Scale.	Date.	No of Sheets published.	By whom published.	Remarks.
Cadastral survey ..	$\frac{1}{2500}$	..	..	..	Not published.
Map of Belgium ..	$\frac{1}{20000}$	1866 in hand.	333 at end of 1879	Dépôt de la Guerre.	Photo-lithographed. To be completed in 450 sheets. Contours 1 m. apart. Principal roads and localities, red; forests and meadowlands, green; cultivation, yellow.
Special military map of Belgium.	$\frac{1}{10000}$ and $\frac{1}{20000}$	1872 in hand.	..	Do.	Photo - zincographed in black. To facilitate the study of ground. The $\frac{1}{10000}$ sheets are tinted by hand, and are for regimental use, tactics, and kriegsspiel.
Neighbourhood of the camp at Beverloo.	$\frac{1}{20000}$	..	24	Do.	Engraved on stone.
Official topographical map of Belgium.	$\frac{1}{40000}$	1865 in hand.	44 at end of 1881	Do.	Engraved on stone. To be completed in 72 sheets. Printed in black, reduced by photography from the $\frac{1}{20000}$ scale. Contours 5 m. apart.
Military map of Belgium.	$\frac{1}{160000}$	1880	4	Do.	Chromo-lithographed. Contours 20 m. apart in bister. Good military positions are tinted pale rose colour.
Special road map of Belgium.	$\frac{1}{160000}$	1880	4	Do.	For the General Staff; gives statistical information for marches and cantonments on mobilization.
Do. do.	$\frac{1}{320000}$	..	1	Do.	To be published shortly.
Étape map of Belgium.	$\frac{1}{65000}$	..	..	Do.	Engraved on stone. Gives halting places.
Do. do.	$\frac{1}{600000}$	..	..	Do.	Railways, routes of communication. Hydrographic and hypsometric maps are published.
Railway map and communications.	$\frac{1}{160000}$	1880	4	Do.	
Geological map of Belgium.	$\frac{1}{20000}$	1854	268 (1881)	Minister of the Interior.	

CONVENTIONAL SIGNS ON THE MAP OF BELGIUM, PUBLISHED BY THE "DÉPÔT DE LA GUERRE." $\frac{1}{40000}$. (*See* Plate V.)

1. Cultivation.
2. Orchard.
3. Meadow.

4. Wood.
5. Heath and Dunes.
6. Peat bog and pits.
7. Marsh and water.
8. Water meadows and mud.
9. Hedges and gardens.
10. Town.
11. Sand and strand.
12. Brushwood and rocks.
13. Railway, single line.
    (1.) Railway cutting.
    (2.) Ditto station.
14. Railway, double line.
    (1.) Railway embankment.
    (2.) Ditto tunnel.
15. Freight railway.
    (1.) Culvert bridge.
    (2.) Bridge over line.
16. Chaussée, paved or metalled.
    (1.) Ditto, with trees.
17. High road, paved or metalled.
18. Local road.
    (1.) Culvert.
19. Track or lane.
20. Footpath.
21. Cutting.
22. Embankment.
23. Roman road.
24. Canal.
    (1.) Lock.
25. Dam, with ditch.
    (1.) Small sluice.
26. Jetty or breakwater.
27. Church.
28. Cemetery.
29. Chapel.
30. Shrine.
31. Cross.
32. Enclosures, bounded by walls, hedges and bushes.
33. Banked enclosures.
34. Enclosures, bounded by wet ditches.
35. Milestone.
36. Frontier stone.
37. Line of telegraph.
38. Telegraph office.
39. Combat (site of).
40. Battle (site of).
41. Lime pit.
42. Spring.
43. Stone windmill.
44. Wooden windmill.

45. Water mill.
46. Saw mill.
47. Forge, factory.
48. Foundry.
49. Trigonometrical point, 1st class.
50. Ditto ditto 2nd class.
51. Ditto ditto 3rd class.
52. Chief place of Province.
53. Ditto "Arrondissement" (Administrative).
54. Ditto ditto (Judicial).
55. Ditto ditto (Administrative and Judicial).
56. Ditto Canton (Militia).
57. Ditto ditto (Justice of the Peace).
58. Ditto ditto (Militia and Justice of the Peace).
59. Boundary of the State.
60. Ditto a Province.
61. Ditto an "Arrondissement."
62. Ditto a Canton.
63. Ditto a Commune.
64. Tower.
65. Lighthouse.
66. Ruins.
    (1.) Farm.
67. Hillock, tumulus.
68. Quarry or sand pit.
69. Castle.
70. Pond.
71. Ravine.
72. Stone bridge.
73. Wooden bridge.
74. Ditto with stone piers.
75. Iron bridge.
76. Ditto with piers.
77. Suspension bridge for carriages.
78. Foot suspension bridge.
79. Bridge of boats.
80. Drawbridge with stone extremities.
81. Ditto wooden extremities.
82. Swinging bridge.
83. Flying bridge.
84. Flying ferry boat.
85. Ferry for carriages.
86. Ferry for foot passengers.
87. Ford for carriages.
88. Ford for horse and man.

DENMARK.

The Government maps are published by the General Staff and by the Topographical Department at Copenhagen.

Printing in colours does not appear to be practised.

Civil Divisions.

Denmark proper is divided into 8 provinces, and further, for administrative purposes, into 18 bailiwicks.

Military Divisions.

For military purposes the Kingdom is divided into 2 general commands, which consist together of 5 territorial brigades; each brigade is sub-divided into 2 demi-brigades or 4 territorial battalions.

Area (exclusive of Faroe Islands, Iceland, &c.), 14,752 square miles.

MEASURES OF LENGTH.

Degree of Meridian (mean).	League.	Meile or Mil.	Rode.	Favn.	Alen.	Fod or Rhineland Foot.	Tomme.	Linie.	Metric Equivalents.		English Equivalents.		
									Metres.	Kilometres.	Inches.	Yards.	Miles.
1	14·5	—	—	—	—	—	—	—	111116·7	111·1167	—	121521·6	69·046
	1	1·01752	2442·048	4070·08	12210·24	24420·48	293045·76	3516549·12	7664·042	7·664042	301720·32	8381·12	4·762
		1	2400	4000	12000	24000	288000	3456000	7532·08	7·53208	296524·8	8236·8	4·6807
			1	1·6	5	10	120	1440	3·138367	·003138367	123·552	3·432	·00195
				1	3	6	72	864	1·8830202	·00188302	74·136	2·0592	·00117
					1	2	24	288	·6276734	·0006276734	24·712	·6864	·00039
						1	12	144	·3138367	·0003138367	12·356	·3432	·000195
							1	12	·026153	·000026153	1·0296	·0286	·0000162
								1	·00218	·00000218	·0858	·0024	·00000135

NOTE.—$\frac{1^\circ \text{ of equator}}{1^\circ \text{ of meridian (mean)}} = \frac{69 \cdot 173}{69 \cdot 046}$ statute miles.

Measures of Surface.

The squares of the measures of length—
The land Tönde = 1,400 square alen.
11 Tönder = 15 English acres nearly.
16 Danish square feet = 17 English sq. feet nearly.

Government Maps of Denmark.

(Longitude is reckoned from Copenhagen, which is 12° 34′ E. of Greenwich.)

Name of Map.	Scale.	Date.	No. of sheets published.	By whom published.	Remarks.
Cadastral survey	$\frac{1}{4000}$	..	..	.. ..	Not published.
Map of Denmark	$\frac{1}{80000}$	1845 in hand.	29 at end of 1879.	Topographical Department of Copenhagen.	Copper engraved, to be completed in 81 sheets. Contours 10 Danish fod apart. It is reduced by photography from the original surveys $\frac{1}{20000}$.
Map of Jutland ..	$\frac{1}{20000}$	1870 in hand.	356 at end of 1880.	General Staff	Direct reproduction by photo-lithography.
Topographical map of Jutland	$\frac{1}{40000}$	do.	55 at end of Oct. 81.	ditto	Copper engraved. To be completed in 131 sheets. Contours 10 Danish fod apart. Coloured by hand where necessary.
Map of Zealand ..	$\frac{1}{160000}$	1869	3	ditto	Contours 30 fod apart. In three sheets.

Conventional Signs on the Topographical Map of Jutland, published by the General Staff of Denmark. $\frac{1}{40000}$. 1880. In course of Publication, in 131 Sheets. (See Plate VI.)

1. Market town or hamlet.
2. Village with church.
3. Church.
4. Village without church.
5. Small group of buildings.
6. Farm rated at 60 Tönder Hartkorn and over.*
7. Ditto 40 to 60 Tönder Hartkorn.
8. Ditto 20 to 40 ditto.
9. Isolated farm or house.
10. Windmill.
11. Watermill.

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* A Tönde (dry measure) is equal to 3·826 English bushels. A Tönde Hartkorn is as much land as can be sown with one tönde of rye, one of barley, or two of oats.

12. Trigonometrical point.
13. Ruin or heaps of stones.
14. Tumulus.
15. Fences, with or without growth.
16. Deciduous wood.
17. Coniferous wood.
18. Thicket.
19. Heath.
20. Marsh.
21. Sand.
22. Meadow.
23. Bog.
24. Lake.
24 (1). Ford.
25. Rushes.
26. Canal.
27. Ditto lock.
28. Stream.
29. Brook.
30. Ditches.
31. Bridge.
32. Spring.
33. Depth of water in fod (1·03 English feet).
34. Railroad.
35. Main road.
36. Country road.
37. Byway.
38. Field road.
39. Footpath.
40. Parish boundary.

Abbreviations.

N$^{\text{re.}}$	North.
S$^{\text{r.}}$	South.
Ö$^{\text{r.}}$	East.
V$^{\text{r.}}$	West.
S$^{\text{te.}}$	Large.
L$^{\text{le.}}$	Small.
G$^{\text{d.}}$	Farm.
G$^{\text{de.}}$	Farms.
H$^{\text{s.}}$	House.
H$^{\text{se.}}$	Houses.
K$^{\text{e.}}$	Church.
S$^{\text{ke.}}$	School.
M$^{\text{l.}}$	Mile.
V$^{\text{ml.}}$	Watermill.
G$^{\text{le.}}$	Old.
M.	Milestone.

FRANCE.

The Government topographical maps are published by the Dépôt de la Guerre, the Dépôt des Fortifications, the Minister of Public Works, the Minister of the Interior, and Minister of Agriculture and Commerce.

Geological Surveys.

These surveys are made and maps published under the direction of the Minister of Public Works.

Civil Divisions.

France is divided into 87 departments, sub-divided into 362 arrondissements, again into 2,865 cantons, and again into 35,989 communes.

Algeria is divided into 3 provinces, and sub-divided into 15 departments.

Military Divisions.

France is divided into 18 Military Districts (Corps d'Armée), each Military District into 2 divisions, each division into 2 brigades, and each brigade into 2 regimental districts.

Algeria consists of 1 Military District (Corps d'Armée), divided into 3 divisions of 5, 3 and 4 brigades respectively.

Area.

The area of France is 204,147 square miles; that of Algeria is 258,346 square miles (estimated).

MEASURES OF LENGTH.

Degree on Equator (60 Geog. miles).	Myriamètre.	Kilomètre (km).	Hectomètre.	Decamètre.	Mètre (m).	Decimètre (dm).	Centimètre (cm).	Millimètre (mm).	Micron (μ).	English equivalents.		
										Inches.	Yards.	Miles.
1	—	111·321	—	—	111321	—	—	—	—	4382804	121744·6	69·173
	1	10	100	1000	10000	100000	1000000	10000000	10000000000	393707·9	10936·33	6·213823
		1	10	100	1000	10000	100000	1000000	1000000000	39370·79	1093·633	·6213823
			1	10	100	1000	10000	100000	100000000	3937·079	109·3633	·06213823
				1	10	100	1000	10000	10000000	393·7079	10·93633	·006213823
					1	10	100	1000	1000000	39·37079	1·093633	·0006213823
						1	10	100	100000	3·937079	·1093633	·00006213823
							1	10	10000	·3937079	·01093633	·000006213823
								1	1000	·03937079	·001093633	·0000006213823
									1	·00003937079	—	—

Note.—$\frac{1^\circ \text{ of equator}}{1^\circ \text{ of meridian (mean.)}} = \frac{69 \cdot 173}{69 \cdot 046}$ statute miles.

A metre is the $\frac{1}{10,000,000}$ part of the distance from Pole to Equator.

MEASURES OF SURFACE.

Square Myriamètre.	Square Kilomètre (km^2).	Hectare (ha).	Are or Square Decamètre (a).	Square Mètre or Centiare (m^2).	Square Decimètre (dm^2).	Square Centimètre (cm^2).	Square Millimètre (mm^2).	English Equivalents.			
								Square Inches.	Square Yards.	Acres.	Square Miles.
1	100	10000	1000000	100000000	10000000000	100000000000	100000000000000	155005910522·41	119603326·02	24711·431	38·61161
	1	100	10000	1000000	100000000	10000000000	1000000000000	1550059105·2241	1196033·2602	247·11431	·3861161
		1	100	10000	1000000	100000000	10000000000	15500591·052241	11960·332602	2·4711431	·003861161
			1	100	10000	1000000	100000000	155005·91052241	119·60332602	·02471143	·00003861161
				1	100	10000	1000000	1550·0591052241	1·1960332602	·00024711	·000000386116
					1	100	10000	15·500591052241	·011960332602	·00000247	·0000000038611
						1	100	·15500591052241	·00011960332602	·0000000247	—
							1	·0015500501052241	·0000011960332602	·000000000247	—

Comparison of Old and New Measures.

Old Measures.																New Measures.		English Equivalents.		
Lieu.						Toise.				Pouce.				Point.						
Géographique.	Marine.	Commune de terrestre.	Métrique.	De Poste.	Mille.	Usuel.	Ancient.	Pied usuel.	Pied de Roi ancient.	Usuel.	Ancient.	Ligne usuel.	Ligne de Paris ancient.	Usuel.	Ancient.	Mètres.	Kilomètres.	Inches.	Yards.	Miles.
1	20	25	27·777	28·5038	57·0082	55555·5̇	57008·22	333333·3	342049·32	4000000	4104560	48000000	49254720	576000000	591053760	111116·7	111·1167	4374780	121521·6	69·046
	1	1·25	1·388	1·42519	2·8504	2777·7̇	2850·4	16666·6	17102·4	200000	2052280	2400000	2462736	28800000	29552688	5555·5	5·5	218739	6076	3·452
		1	1·1111	1·1401	2·2803	2222·22	2280·3	13333·32	13681·8	160000	164182·4	1920000	1970188·8	23040000	23642150	4444·4	4·4	17499·2	4860·8	2·76
			1	1·02614	2·0522	2000	2052·29	12000	12313·68	144000	147764·16	1728000	1773158	20736000	21277800	4000	4	157483·16	4374·53	2·485
				1	2	1949·2	2000	11695·2	12000	140342·4	144000	1684108	1728000	20209296	20736000	3898·4	3·8984	153475·2	4263·2	2·422
					1	974·5	1000	5847·6	6000	70171·2	72000	842054	864000	10104648	10368000	1949·2	1·9492	76737 6	2131·6	1·214
						1	1·02614	6	6·15684	72	73·88208	864	886·579	10368	10638·9	2	·002	78·74158	2·18726	·00124
							1	5·8476	6	70·1712	72	842·054	864	10104·64	10368	1·9492	·0019492	76·7376	2·1316	·001211
								1	1·02614	12	12·3136	144	147·763	1728	1773·156	·3̇	·0003̇	13·12359	·36454	·000206
									1	11·6952	12	140·3424	144	1684·108	1728	·3249	·0003249	12·7896	·3552	·000202
										1	1·02614	12	12·3136	144	147·763	·027̇	·000027̇	1·094	·03038	·0000172
											1	11·6952	12	140·342	144	·027072̇	·000027072̇	1·0658	·0296	·000017
												1	1·02614	12	12·3136	·002314	·000002314	·091	·002462	·0000015
													1	11·695	12	·00225	·00000225	·0888	—	—
														1	1·02614	·000192	·000000192	·00759	—	—
															1	·000187	·000000187	·0074	—	—

Note.—The "Metric" system was instituted in 1795, to supercede the "Ancient" system. The "Système Usuel" was introduced in 1812 as a sort of compromise with those people who showed an irreconcilable aversion to the Metric system, upon which, however, the former was based. The old measures were interdicted by law in 1840.

(For converting English miles into kilomètres, multiply by 1·6093; kilomètres into miles, multiply by ·6214.)

$$\left[\frac{1^\circ \text{ of equator}}{1^\circ \text{ of meridian}} = \frac{69\cdot173}{69\cdot046} \text{ statute miles.}\right]$$

(Mean.)

OLD MEASURES OF SURFACE.

The arpent or acre was generally 100 square perches, but the perche varied in different provinces.

The legal perche was equal to 7·8156 English yards; the legal arpent was equal to 1·262 English acres.

GOVERNMENT MAPS OF FRANCE.

Longitude is reckoned from Paris, which is 2° 20′ E. of Greenwich.

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Cadastral survey ..	$\frac{1}{2500}$	..	..	..	Not published.
Staff map of France	$\frac{1}{80000}$	1833 to 1880	274 In quarter sheets.	Dépôt de la Guerre.	Copper engraved. Hill features in hachures; altitudes. In progress.
Map of the Alps (frontiers).	$\frac{1}{80000}$	1877	72	Do.	Stone engraved; 3 colours; contours 20 m. apart.
Staff map of France	$\frac{1}{320000}$	1852 to 1878	33	Do.	Copper engraved.
Map of the Alps ..	$\frac{1}{320000}$	1877	10	Do.	Stone engraved; 3 colours.
Contour map of France.	$\frac{1}{800000}$	..	6	Do.	Stone engraved; in 3 colours. Contours 100 m. apart. In 6 sheets.
Chorographical map of France.	$\frac{1}{200000}$	..	77	Do.	Zincographed in 5 colours.
Do. do.	$\frac{1}{600000}$	..	..	Do.	Copper engraved.
Railway map of France.	$\frac{1}{800000}$	..	9	Do.	Photo-zincographed in 7 colours. No hills.
Do. do.	$\frac{1}{1600000}$	..	..	Do.	Copper engraved.
Plan of towns ..	$\frac{1}{20000}$	In hand.	..	Do.	Do.
Military map of the principal European States.	$\frac{1}{240000}$	..	..	Do.	Do.
Central Europe ..	$\frac{1}{320000}$	..	52	Do.	Do.
Topographical map of France.	$\frac{1}{50000}$	..	950	Do.	Zincographed.
Plan of Toul and its environs.	$\frac{1}{10000}$	..	49	Dépôt des Fortifications.	Photo-zincographed; also on $\frac{1}{20000}$ scale. The plans of other towns for the study of fortification, as Verdun, Dijon, Belfort, and Paris have been published on the same scales. For more exact study of ground, the scales $\frac{1}{1000}$ and $\frac{1}{2000}$ are used.
Map of France ..	$\frac{1}{500000}$	..	10	Do.	For the use of engineers. It is published in 3 types. (i) Complete; (ii) road map, with contours 100 m. apart; (iii) orographic, giving only the ground, water, and names. To be completed in 15 sheets.

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Hypsometric map of France.	$\frac{1}{400000}$	..	..	Dépôt des Fortifications.	The zones below 500 m. in height are coloured yellow; from 500 m. to 1000 m., green; above this, brown. The depth of colour in each zone increases with the altitude.

The Dépôt de la Guerre and the Dépôt des Fortifications have also published many models of ground round Paris, Cherbourg, rifle ranges at Nîmes, Dijon, &c.

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Geological map of France.	$\frac{1}{80000}$	..	..	Minister of Public Works.	
Map of railways of general interest.	..	1878	1	Do.	Each net has a separate colour, including lines working or in construction.
Map of the communications (interior).	$\frac{1}{500000}$	..	6	Do.	Completed.
Carte de la France (interior communications and public works).	$\frac{1}{200000}$	1879 In progress	15 1882 (April)	Do.	To be completed in 141 sheets, in 3 colours, engraved upon copper.
Map of railways of local interest.	..	1878	1	Do.	In 8 colours. The departments are shown by flat washes.
Map of the interior navigation of France	$\frac{1}{1250000}$	1878	1	Do.	In 8 colours.
National roads of France.	$\frac{1}{1390000}$	..	..	Do.	In 4 colours.
Statistical atlas of the commerce of France.	..	1878	19	Minister of Agriculture and Commerce.	
Road and hydrographical map of France (Carte Vicinale).	$\frac{1}{100000}$	1879 In hand.	81 (1881)	Minister of the Interior.	To be completed in 596 sheets. Chromo-lithographed. No hills or altitudes. Roads are coloured red; woods, green; water, blue. Number of inhabitants of communes are given.
Topographical map of the Department of the Vosges.	$\frac{1}{80000}$	..	..	Do.	Chromo-lithographed in 5 colours.
Atlas of the ports of France.	$\frac{1}{4922}$ and various.	1872 Still publishing.	78	Minister of Marine.	Only fathom lines (metres) shown; no soundings.

CONVENTIONAL SIGNS FOR THE STAFF MAP OF FRANCE. $\frac{1}{80000}$.

(*See* Plate VII.)

1. Mountains.
2. Wood.
3. Arable land.
4. Meadow.

5. Vineyard.
6. (1.) Gardens.
   (2.) Orchards.
7. Morasses.
8. Heath.
9. Downs.
10. Sand tract.
11. Railway.
12. Government road (1st class roads).
    (1.) With trees.
    (2.) Without trees.
13. Department road (2nd class roads).
    (1.) With trees.
    (2.) Without trees.
14. Cross road (routes auxiliaires).
    (3rd class roads).
    (1.) With trees.
    (2.) Without trees.
15. Commune road.
    (1.) With trees.
    (2.) Without trees.
16. Local road.
    (1.) With trees.
    (2.) Without trees.
17. Footpath.
18. Neglected (little used) ancient road.
19. Canal.
20. Causeway.
21. Ditch.
22. Houses with intricate plan.
23. Groups of houses.
24. Isolated houses.
25. Church.
26. Chapel.
27. (1.) Cross.
    (2.) Churchyard.
28. (1.) Telegraph station.
    (2.) Lighthouse.
29. Water and steam mill.
30. Windmill.
31. Quarries.
32. Trigonometrical point.
33. Tower as trigonometrical point.
34. Posting station.
35. Department, or prefecture boundary.
36. Arrondissement, or sub-prefecture boundary.
37. Canton, or police boundary.
38. Commune boundary.
39. Office of the prefect.
40. Office of the sub-prefect.
41. Office of the canton director.

CONVENTIONAL SIGNS GENERALLY USED TO REPRESENT POSITIONS OF TROOPS, &C., UPON MAPS AND SKETCHES. SCALE $\frac{1}{80000}$.

(*See* Plate VII.)

1. Army head quarters.
2. Head quarters of army corps.
3. Ditto 1st division.
4. Ditto 2nd ditto
5. Ditto cavalry ditto.
6. Ditto infantry brigade.
7. Ditto cavalry ditto.
8. Companies of infantry.
9. Ditto engineers.
10. Cavalry pelotons.
11. Squadron of cavalry.
12. Infantry battalions in double column.
13. Ditto ditto deployed.
14. Battalion (chasseurs).
15. Brigade of infantry.
16. Ditto cavalry.
17. Regiment of cavalry (en bataille).
18. Batteries in position.
19. Ditto reserve.
20. Infantry ammunition section.
21. Artillery ditto ditto.
22. Artillery park.
23. Pontoon train.
24. Head quarter supply train.
25. Divisional supply train.
26. Head quarter ambulance train.
27. Divisional ambulance train.
28. Cavalry brigade ambulance train.
29. Cavalry division ambulance train.
30. Engineer park of army corps.
31. Telegraph section.
32. Field remount depôt.
33. Infantry on the march.
34. Cavalry ditto.
35. Artillery ditto.
36. Column of troops of all arms ditto.

Abbreviations used on the Staff Map of France.

Arb.	Tree.
F$^{bg.}$	Faubourg.
H$^{au.}$	Hamlet.
Cit$^{le.}$	Citadel.
P$^{te.}$	Gate.
F$^{t.}$	Fort.
Red$^{e.}$	Redoubt.
Retr$^{nt.}$	Entrenchment.
Bat$^{ie.}$	Battery.

Ch^{au}.	Château.
T^{r}.	Tower.
S^{al}.	Signal.
Télég^{e}.	Telegraph.
Sém.	Semaphore.
Ph.	Lighthouse.
Conv^{t}.	Convent.
Abb^{e}.	Abbey.
Eg^{se}.	Church.
Cim^{re}.	Cemetery.
Ch^{lle}.	Chapel.
Cr^{x}.	Cross.
D^{ne}.	Custom house.
Pte.	Post.
Pte de D^{ne}.	Ditto (customs).
Aub^{ge}.	Inn.
Cab^{et}.	Tavern.
Colomb^{r}.	Pigeon house.
B^{ide}.	Small country house.
Mal^{rie}.	Lazaretto.
M.	Small country house.
Mét^{ie}.	Small farm.
F^{me}.	Farm.
B^{de}.	Border.
C^{se}.	Small farm.
G^{ge}.	Barn.
B^{que}.	Barracks.
C^{ne}.	Cottage.
Ec^{ie}.	Stable.
Vac^{ie}.	Cowhouse.
B^{ie}.	Sheepfold.
Ch^{et}.	Swiss cottage.
Etab^{nt}.	Establishment.
Us^{e}.	Workshop.
Fab^{e}.	Manufactory.
Manuf^{re}.	Factory.
Sc^{ie}.	Saw mills.
F^{ge}.	Forge.
Pap^{ie}.	Paper mill.
F^{rie}.	Foundry.
V^{rie}.	Glass factory.
Poud^{ie}.	Powder mills.
Salp^{ie}.	Saltpetre house.
T^{ie}.	Tile kiln.
Briq^{ie}.	Brick kiln.
M^{in}.	Mill.
Carr^{e}.	Quarry.
R^{te}.	Road.
Nat^{le}.	National.
Dép^{le}.	Departmental.
Ch^{in}.	Road.

Carref$^{r.}$	Cross road.
Et$^{le.}$	Cross roads.
Emb$^{re.}$	Terminus.
St$^{on.}$	Station.
P$^{ge.}$	Ferry.
B$^{re.}$	Gate.
I.	Island.
Pl$^{au.}$	Plateau.
C.	Cape.
P$^{te.}$	Point.
P$^{t.}$	Port.
Ch$^{ée.}$	Main road.
J^{ée}.	Pier.
Dig.	Dyke.
B$^{che.}$	Mouth.
Emb$^{ure.}$	Estuary.
Lag.	Lagune.
L$^{de.}$	Sandy grounds.
L.	Lake.
B$^{in.}$	Bassin.
Et$^{g.}$	Pond.
V$^{er.}$	Fish pond.
M^{s}.	Marsh.
Fl.	Large river.
R.	River.
T$^{nt.}$	Torrent.
R$^{au.}$	Stream.
P$^{t.}$	Bridge.
F$^{ne.}$	Spring.
V$^{ée.}$	Valley.
V$^{on.}$	Small valley.
Q$^{r.}$	Quarter.
C$^{al.}$	Canal.
E$^{cse.}$	Sluice.
Aq$^{uc.}$	Aqueduct.
Ch$^{ne.}$	Chain.
M^{t}.	Hill.
M$^{gne.}$	Mountain.
Som.	Summit.
P.	Peak.
Aig$^{le.}$	Spire.
R$^{er.}$	Rock.
G$^{ge.}$	Gorge.
Gl$^{er.}$	Glacier.
F$^{t.}$	Forest.
B.	Wood.

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GERMANY.

The trigonometrical, topographical, and cartographical work in Prussia is performed by Officers of the General Staff; the geodetic work. viz., the "European measurement of degrees," by the Geodetic Institute, under the direction of the Ministry for Spiritual, Educational and Medical Affairs.

The triangulation points are numerous, and there is no necessity for further triangulation by the topographer, who uses the plane table for his $\frac{1}{25000}$ sheets. This scale admits of all necessary details being given, and permits a measurement of distance to within 15 ft.

Cost, about £12 per sq. mile.

Maps on a scale of $\frac{1}{100000}$ are reductions from the $\frac{1}{25000}$ plans.

Contours of 5 metres vertical interval are ordinarily used; but for military purposes 2·5 m. or 1·25 m. difference is used. In military maps ($\frac{1}{25000}$), when the hill features are represented by hachures, there are 40 hachures in each 3 c.m. (1·18 En. inch), and they represent every 5° of slope up to 45°; the ratio of the black line to its immediate blank space is shown thus $\frac{x^\circ}{45^\circ - x^\circ}$ when x° is the slope denoted.

Lehmann's method of vertical hachures is full straight lines; in Maffling's modification some lines are broken and some waving. Maffling's system is used on the $\frac{1}{100000}$ maps for slopes of 5° and 10°, Lehmann's system for steeper ones.

Geological Surveys.

The geological surveys are performed by the R. Geological Land Institute, under the direction of the Ministry of Commerce, Industry and Public Works. There is also a similar institute in Saxony.

Civil Divisions.

The present Empire consists of 26 States, of which 4 are Kingdoms, 6 Grand Duchies, 5 Duchies, 7 Principalities, 3 Free Towns, and 1 Imperial Territory (Alsace-Loraine).

These States, for administrative purposes, are subdivided into provinces, again into either circles (Kreis), districts, lordships or domains, and again into either bailiwicks or communes.

Military Divisions.

For military purposes the Empire is divided into 17 Army-Corps districts, each consisting of 2 divisional districts. Each divisional district is divided into 2 Infantry Brigade districts, and the latter again into from 2 to 6 Landwehr-Battalion districts. The latter are finally divided into from 2 to 6 company districts, which are based upon the political sub-division of the State into circles (Kreis).

Area.

Area is 208,813 square miles.

Measures.

Germany has adopted the metrical system for measures (*see* France) since January 1st, 1872.

The German metrical mile = 1,500 metres = ·932 Eng. stat. miles.

The metre = stab = staff = rod = ell
„ millimetre = strich = linie.
„ decametre = kette = chain.
„ centimetre = neuzoll.
„ square metre = qradratmetre, or quadratstab.

Each of these were of different lengths in the several States of Germany, but in the metrical system their value is the same for all.

COMPARISON OF THE OLD AND NEW MEASURES OF LENGTH—PRUSSIA.

Old Measure.														New Measure.	English Equivalents.		
Degree on the Meridian (mean).	Post.	Long Meile.	Post Meile.	German Geographical Mile.	Short Meile.	Ruthe.	Klafter or Faden.	Schritt.	Ell.	Rhein Fuss.	Zoll.	Linie or Strich.	Scrupel.	Metres or Stab.	Inches.	Yards.	Miles.
1	7·5	12	14·7518	15	17·717	29503·68	59007·36	70808·53	166616·45	354044·2	4248530	50982359	611788309	111116·7	4374780	121521·6	69·046
	1	1·6	1·96688	2	2·3622	3934	7868	9441·6	22215·53	47208	566470·66	6797648	81571774·46	14815·5726	583300·8	16202·8	9·206
		1	1·2293	1·25	1·4764	2458·64	4917·28	5900·7	13884·7	29503·2	354044·2	4248530	50982359	9259·733	364564·8	10126·8	5·7539
			1	1·0168	1·2	2000	4000	4800	11294·116	24000	288000	3456000	41472000	7532·64	296559·36	8237·76	4·6805
				1	1·1811	1967	3934	4720·8	11107·76	23604	283235·3	3398824	40785887·23	7407·7863	291650·4	8101·4	4·603
					1	1665·25	3330·5	3996·6	9404·38	19983	239796	2877552	34530624	6271·5023	246914	6858·72	3·8972
						1	2	2·4	5·64705	12	144	1728	20736	3·76632	148·27968	4·11888	·0023402
							1	1·2	2·82353	6	72	864	10368	1·88316	74·13984	2·05944	·0011701
								1	2·3529	5	60	720	8640	1·5693	61·7832	1·7162	·000975
									1	2·125	25·5	306	3672	·6669725	26·2579	·7294	·000414
										1	12	144	1728	·31386	12·35664	·34324	·000195
											1	12	144	·02615	1·029722	·0286	·000016
												1	12	·00218	·0858	·0024	—
													1	·00018	·0072	·0002	—

NOTE.— $\frac{1^\circ \text{ of equator}}{1^\circ \text{ of meridian (mean)}} = \frac{69 \cdot 173}{69 \cdot 046}$ **English statute miles.**

A German geographical mile is identical with 4 English mean nautical miles, and almost identical with 4 English geographical miles.

The following are the equivalent values in metres and English inches of the "fuss" in the several States of the German Empire, according to the old system:—

Name of State.	Metre or Stab.	English Inches.
Prussia*	·31386	12·35664
Baden Nassau	·30000	11·81123
Oldenburg	·29588	11·649
Hanover Lubeck	·2908	11·45
Bavaria	·2901	11·42
Bremen	·289	11·38
Hesse (Electoral)	·28770	11·32692
Mecklenburg Hamburg	·2868	11·2788
Wurtemburg	·28649	11·2776
Brunswick	·2852	11·23
Frankfort	·28461	11·20536
Saxony	·28319	11·14944
Hesse (Ducal)	·25000	9·8426975

* The Rhein "fuss."

COMPARISON OF THE OLD (PRUSSIA) AND NEW MEASURES OF SURFACE.

Old Measures.					New Measures.			English Equivalents.		
Hufe.	Haken.	Morgen.	Square or Quadrat Ruthe.	Square Rhein Fuss.	Square Metre, Quadrat Metre, or Quadrat Stab.	Ar.	Hectar.	Square Inches.	Square Yards.	Acres.
1	6·75	30	5400	777600	76596·46	765·9646	7·659646	118729063	91612	18·928
	1	4·44	800	115200	11347·624	113·47624	1·1347624	17589491	13572·136	2·804
		1	180	259200	2553·21536	25·53215	·2553215	3957635·4	3053·731	·63093
			1	144	14·18453	·1418453	·00141845	21986·8635	16·96517	·003505
				1	·098504	·00098504	·00000985	152·686	·1178	·0000243

GOVERNMENT MAPS OF GERMANY.

(Longitude is reckoned from Ferro Island (Canaries) which is 18° 9′ W. of Greenwich.)

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Map of the German Empire.	$\frac{1}{100000}$	1880 in hand.	48 (1881).	General Staff..	Copper engraved. To be completed in 674 sheets, of which Prussia takes 544 ; Bavaria, 80 ; Saxony, 30 ; Württemberg, 20. Estimated time, 20 years. Meridians from Berlin.
Geological Map of the German Empire.	$\frac{1}{25000}$			Royal Geological Land Institute.	This is a special map based on the plane table sheets of the Staff Map $\frac{1}{25000}$. As the work proceeds the results are newly placed together in the general Map $\frac{1}{100000}$.
Alsace-Lorraine ..	$\frac{1}{80000}$	1878	38	Topo. Dept., Berlin.	Heliographed. Adapted from the French Staff Map.
Central Europe ..	$\frac{1}{200000}$	In hand.	320 at end of 1879.	ditto	Reyman's special map.
Prussian States, &c.	$\frac{1}{25000}$	1821 in hand.	926 at end of 1879.	ditto.	
Ditto	$\frac{1}{100000}$	1841 in hand.	350 (1881).	ditto	To be included in the map of the German Empire, 132 sheets being engraved Nov. 1880. 170 sheets in hand.
Prussian military maps.	$\frac{1}{12500}$ $\frac{1}{25000}$ $\frac{1}{50000}$	..	..	ditto.	
Rhenish Prussia, Westphalia.	$\frac{1}{80000}$	1840 to 1854	72	ditto	Lithographed.
Hohenzollern ..	$\frac{1}{50000}$	1863	9	ditto.	
Neighbourhood of Berlin and Potsdam.	$\frac{1}{50000}$	1840 to 1860	60	ditto.	
Ditto	$\frac{1}{50000}$	1872 to 1878	36	ditto	The centre sheets of last map revised.
Position map of Bavaria and Rhenish Bavaria.	$\frac{1}{25000}$	1875 in hand.	815 at end of 1879.	Topo. Dept., Munich.	Photo-lithographed. To be completed in 990 sheets. Contours 10 m. apart.
Ditto	$\frac{1}{500000}$	1853	3	ditto	With hills.
Topographical atlas of Bavaria.	$\frac{1}{50000}$	1812 to 1868	112	ditto	Copper engraved. A new edition is coming out in half sheets, 26½ were published at end of 1879.
Rhenish Bavaria	$\frac{1}{150000}$	1845	4	ditto	With hills.
Ditto	$\frac{1}{250000}$	1862	2	ditto	ditto.

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Bavaria	$\frac{1}{250000}$	1849 to 1853	15	Topo. Dept., Munich.	No hills.
Ditto	$\frac{1}{250000}$	do.	do.	ditto	With hills.
Hanover, Brunswick, &c.	$\frac{1}{100000}$	1832 to 1847	66	Topo. Dept. at Hanover.	Copper engraved, at Papen's Engineer Office.
Hanover	$\frac{1}{250000}$	1865	4	ditto.	
Hesse Cassel ..	$\frac{1}{25000}$	1859 to 1861	112	Topo. Dept. at Cassel.	Chromo-lithographed, contours, red, 22·596 m. apart.
Ditto ..	$\frac{1}{50000}$	1840 to 1858	40	ditto.	
Ditto ..	$\frac{1}{200000}$	1857 to 1859	2	ditto.	
Ditto ..	$\frac{1}{350000}$	1861	1	ditto.	
Hesse-Darmstadt	$\frac{1}{50000}$	1831 to 1852	31	Topo. Dept. at Darmstadt.	Lithographed.
Ditto	$\frac{1}{250000}$	1867	2	ditto.	
Schleswig ..	$\frac{1}{120000}$	1857 to 1858	6	Topo. Dept. at Copenhagen.	Copper engraved.
Ditto ..	$\frac{1}{240000}$	1860	1	ditto	ditto.
Holstein and Lauenburg.	$\frac{1}{120000}$	1831	8	ditto	ditto.
Oldenburg ..	$\frac{1}{50000}$	1856 to 1863	14	Shrenk ..	Lithographed.
Ditto ..	$\frac{1}{100000}$	1853	3	ditto.	
Ditto ..	$\frac{1}{200000}$	1856	1	ditto.	
Saxony	$\frac{1}{100000}$	1864 in hand.	28 at end of 1879.	Topo. Dept. at Dresden.	Copper engraved and lithographed.
Ditto	$\frac{1}{25000}$	1875 in hand.	60 at end of 1879.	ditto	Contours 10 m. apart.
Ditto	$\frac{1}{57600}$	1821 to 1860	22	ditto.	
Württemburg ..	$\frac{1}{25000}$	In hand.	56 at end of 1879.	Royal Railway Commission.	Chromo-lithographed. To be completed in 713 sheets. Contours 5 m. interval.
Ditto ..	$\frac{1}{50000}$	1829 to 1854	55	Topo. Dept. at Stuttgart.	
Ditto ..	$\frac{1}{120000}$	1842 to 1853	4	ditto.	

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Württemburg ..	$\frac{1}{400000}$	1841	1	Topo. Dept. at Stuttgart.	
South-West Germany.	$\frac{1}{250000}$	1868	25	General Staff, Munich.	
Ditto	$\frac{1}{288000}$	1865	12	General Staff, Vienna.	
Baden	$\frac{1}{25000}$	..	170	General Staff.	
Do.	$\frac{1}{50000}$	1838–49	56	ditto.	
Do.	$\frac{1}{200000}$	1855–64	6	ditto.	
Do.	$\frac{1}{400000}$	1868	..	ditto	Chromo-lithographed.

Conventional Signs for Prussian Military Maps, $\frac{1}{12500}$, $\frac{1}{25000}$, $\frac{1}{50000}$.*—(*See* Plate VIII.)

1. Trigonometrical point.
2. Geometrical point.
3. Sign post.
4. Notice board.
5. Well, spring.
6. Prominent tree.
7. Boundary tree.
8. Boundary post.

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* In coloured plans (col. pl.)

Embankment slopes: fences, jetties, and banks revetted with wickerwork, portion of towns built of wood are—*light grey.*

Water, waterstrokes in damp ground—*Prussian blue.*

Roads on rock, Chausséеs, stone causeways, quays and bridges of stone, quarries, portion of towns solidly built—*crimson lake.*

Unreliable country roads, wooden causeways, plank and lattice-work fences, ferries by wherry, wagon, or rope, wooden bridges and piles, bridges of boats, dry ditches, icebreakers, toll-bars, jetties and sluices of wood, cask buoys, beacons, marks showing shallow water, mills, timber work—*gamboge.*

High roads, roads joining towns, earth causeways, avenues, peat fields, loam pits, marl pits, clay pits; the dots for sand tracts, downs, dry beds of streams, the sign for hop gardens—*burnt sienna.*

Shrines of stone, milestones, boundary stones, railway stopping places, walls, chapels, churches, stone buildings, forest office, and mill signs, lighthouses, watchtowers, and monuments, geometrical points, mills, stone pillars and sluices, the solid substructure of railway viaducts—*vermilion* (*zinnoberroth*).

Improved roads—*Venetian red* (*mennige*).

Deciduous woods, railways, group of trees in a park, hedges, plantations, underwood bushes and heath—*violet.*

Coniferous woods—*sepia.*

Chief contour lines 20 metres (65·618 Eng. feet) interval—*bistre* (bister).

Most important buildings in cities—*purple.*

Gardens, boundary trees, prominent trees, rushes, patches of grass in grazing grounds, elevated spots in mossy bogs—*emerald green.*

Dry and wet meadows, grassy patches, swamps, bogs, pasture ground—*yellow-green.*

Sand tracts, heath tracts—*yellow ochre.*

Open places and courtyards in cities, all roads in markets and villages; the paths and courtyards in manors, country seats, farms, gardens, &c.—*orange.*

9. Boundary hill.
10. Heap.
11. Boundary stone.
12. Cross.
13. Shrine.
14. Monument.
15. Paper mill (cylindrical).
16. Windmill.
17. Mill.

When M is placed with it, it denotes, grain mill.

	DM	ditto	steam mill.
	LM	ditto	tan mill.
	OM	ditto	oil mill.
	SM	ditto	saw mill.
	PM	ditto	paper mill.
	Pulv. M	ditto	powder mill.
	WM	ditto	fulling mill.
18.	When Brk. G	ditto	lignite pit.
	St. KG	ditto	pit, coal pit.
19.	When Ks. G	ditto	gravel pit.
	Sd. G	ditto	sand pit.
	Th. G	ditto	tar pit.
	LG	ditto	loam pit.
	MG	ditto	marl pit.
20.	When St. Br.	ditto	quarry.
21.	When KO	ditto	lime kiln.
	CO	ditto	coke oven.
22.	When TO	ditto	tar oven.
23.	When BO	ditto	baking oven.

24. Alum mine.
25. Arsenic mine.
26. Lead mine.
27. Lignite mine.
28. Iron mine.
29. Cadmium mine.
30. Copper mine.
31. Cobalt mine.
32. Salt mine.
33. Saltpetre mine.
34. Silver mine.
35. Pit coal mine.
36. Vitriol mine.
37. Forges.

When DHr. is placed with it, denotes wireworks.

PHr.	ditto	ore pounding works.
KHr.	ditto	copper works.
Bl.H.	ditto	sheet iron forge.

38. Ruins.
39. Watch tower.
40. Lighthouse.
41. When FA is placed with it, denotes Office of the Woods and Forests.

When OF is placed with it, denotes Upper Office of the Woods and Forests.
UF ditto Under ditto.
Ww. ditto wood ranger.

42. Stone building.
    (1.) Wooden building.
43. When BW is placed with it, denotes railway guard house.
    AP ditto ditto stopping place.
44. Stone chapel.
    (1.) Wooden chapel.
45. Stone church.
    (1.) Wooden church.—In plan a small circle on the side where the tower is.
46. Christian churchyard.
47. Churchyard not Christian.
48. Country frontier.
49. Province boundary.
50. Government district boundary.
51. Circle (kries) boundary.
52. Wall.
53. Plank fence.
54. Lattice fence.
55. Hedge.
56. Bank.
57. Hurdles.
58. Heliographic, or optical signal communication.
59. Electric telegraphic communication.
60. Railway, double line.
61. Railway, single line.
62. Railway, in course of construction.
63. Railway, projected.
64. Railway, not for passengers.
65. Horse tramway.
66. Chaussée, secured means of repair, with rows of trees. The trees are shown by black points.
67. Chaussée, secured means of repair, without rows of trees.
68. Improved road, the so-called vicinal ways and gravelled roads.
69. Common country and posting road (not Chaussée).
70. Permanent country and cross road.
71. Unreliable road through woods, fields, and heath.
72. Footpath.
73. Country track.
74. Cattle passage.
75. Stone causeway.
76. Wooden causeway.
77. Earthen causeway.
78. Hollow way.
79. Embanked road.
80. Dragshoe required.
81. Turnpike.
82. Viaduct.

83. Tunnel.
84. Culvert or culvert bridge.
85. Dry ditches.
86. Wet ditches.
87. Drain.
88. Small water conduit.
89. Larger water conduit (canal).
90. Stream, brook.
91. River.
92. Sluice.
93. Weir.
94. Ford.
95. Ferry by wherry.
96. Ferry for wagons.
97. Boat ferry by rope.
98. Foot bridge.
99. Flying bridge.
100. Bridge of boats.
101. Wooden bridge.
102. Stone bridge.
103. Railway bridge.
104. Ice breakers.
105. Direction of the current.
106. Navigability commences.
107. Jetty of stone.
108. Jetty of wood.
109. Beacon.
110. Barrel, buoy.
111. Anchorage.
112. Ponds, lakes (small holes and sloughs).
113. Garden.
114. Garden intersected by numerous ditches.
115. Vineyard.
116. Hop garden.
117. Dry meadow.
118. Water meadow.
119. Soft ground.
120. Mossy bog.
121. Bog, morass, swamp.
122. Pasturage.
123. Heath.
124. Copse.
125. Bushes.
126. Wood, deciduous trees.
127. Wood, coniferous trees.
128. Wood, mixed.
129. Plantation.

All towns, villages, extensive farms &c., are given in plan.

The hill features are shown by hachures after Muffling's method from 0°–10° *and after Lehmann's method from* 10°–40° *and further by contours* 65·618 *feet* (20 *m.*), 32·809 *feet* (10 *m.*), 16·405 *feet* (5 *m.*), 7·202 *feet* (2½ *m.*), *and* 4·1 *feet* (1¼*m*), *intervals.*

Abbreviations &c. on the Prussian Land Surveys, used without other signs.

Zgl.	Brick factory.
n.	"To" (direction of road).
v.	"From" (direction of road).
Fl.	River.
Khf.	Churchyard.
Bhf.	Railway station.
B.	Brook.
M.	Mile.
Kl.	Small.
Ex. Pl.	Drill ground.
Üb. Pl.	Manoeuvre ground.
B.	Mountain or large hill.
Ltte.	Lunette.
Schäf.	Sheep fold.
Fbr.	Manufactory.
Vw.	Farm or manor.
Trig P.	Trigonometrical point.
Mt.	Monument.
Wth.	Watch tower.
T.	Tunnel.

CONVENTIONAL SIGNS FOR THE MAP OF THE GERMAN EMPIRE.

$\frac{1}{100000}$. (*See* PLATE IX.)

1. Railway.
    1. Viaduct.
    2. Embankment.
    3. Horse Tramway.
    4. Station.
    5. Bridge over line.
    6. Tunnel.
    7. Cutting through railroad.
    8. Level crossing.
    9. Halting Place.
    10. Bridge under line.
2. Chaussée, 1st Class.
    1. Stone culvert.
    2. Embankment.
    3. Cutting.
    4. Wooden culvert.
3. Chaussée, 2nd Class.
4. By-way, local road (unmacadamised).
    1. Cutting.
5. Field or Forest Road.
    1. Embankment.
6. Footpath.
7. Path for pack animals (mountain paths).
8. Dam and ditch.
9. Boundary of Empire and States.
10. ditto counties (Regierungsbezirks)
11. ditto circles (Kreis).

12. Woods.
    1. Deciduous.
    2. Coniferous.
    3. Mixed.
13. Copse.
    1. Copse, cut.
14. Nursery or orchard.
15. Heath.
16. Dry waste land.
17. Wet ditto.
18. Moor, peat pits.
19. Vineyard.*
20. Hop garden.
21. Park and garden.
22. Ford.
23. Wooden bridge.
24. Foot bridge.
25. Stone bridge.
26. Steep bank.
27. Well, spring.
28. Brook.
29. Wet ditches.
30. Dry ditto.
31. Rushes.
32. Weir.
33. Canal.
34. Lock.
35. Drained marsh land.
36. Dam of Piles.
37. Boat ferry (Flying Bridge).
38. ditto for wagons.
39. ditto by wherry.
40. Bridge of boats for railway.
41. Bridge of boats.
42. Floating Mills.
43. Direction of current.
44. Railway bridge, stone or iron, with wooden superstructure.
45. ditto ditto ditto stone ditto.
46. Sand.
47. Harbour for boats.
48. Quays.
49. Dunes.
50. Mole.
51. Collection of seaweed.
52. Lightship.
53. Lighthouse.
54. Beacon.
55. Buoy, floating.
56. Buoy, broomstick.
57. Mill for draining land.
58. Church } No distinction made between wooden and
59. Chapel } stone.

60. Windmill.
61. Watermill } Description of business carried on is always
62. Forge } underwritten.
63. Head Forester.
64. Under Forester.
65. Wood Watchman.
66. Watch Tower.
67. Ruin.
68. Remarkable Tree.
69. Important battlefield.
70. Old earthwork.
71. Monument.
72. Important wall.
73. Wall with hedge.
74. Mine (the description is always underwritten).
75. Quarry.
76. Gravel pit.
77. Rocks.
78. Burial-ground for Christians.
79. Burial-ground for Jews.
80. Lime-kiln.
81. Tar pit.
82. Trigonometrical point.
83. Chief town of circle.
84. Country town.
85. Village with church.
86. Country residence or large farm.
87. Hamlet of over 100 inhabitants.
88. ditto under ditto.

Abbreviations.

Bhf.	Railway station.
Dreh. Br.	Drawbridge.
Entw. M.	Mill for draining land.
Fl. Br.	Ferry (Flying Bridge).
Fabr.	Manufactory.
Gtt. Br.	Girder Bridge.
H. St.	Halting station on railways.
Ktt. Br.	Suspension Bridge.
K. F.	Ferry by wherry.
K. O.	Limekiln.
O. F.	Head Forester.
P. M.	Powder Magazine.
Schl.	Castle.
Schäf.	Sheepfold.
T. O.	Tar-pit.
U. F.	Under Forester.
W. F.	Ferry for wagons.
W. W.	Watchman of woods or of lands.
Zgl.	Brickkiln.

[Note.]—Heights are written in figures leaning to the right and depths in figures leaning to the left.

INDIA

The Department of the Surveyor-General of India consists of the Trigonometrical Survey Branch, the Topographical Survey Branch, and the Revenue Survey Branch.

Trigonometrical Survey Branch.

The principal triangulation of the regions between Afghanistan and Burmah, the Himalayan mountains and the Indian Ocean, has, under the management of the Government of India, just recently been completed as regards the linear and angular measurements and the field operations generally.

The principal triangulation of all India, as originally designed by Col. Everest in 1832 with the approval of the East India Company, was intended to consist of a system of meridional chains of triangles at intervals of about 1° apart, tied together by longitudinal chains at about 6° apart, the whole being enclosed within a periphery formed by a chain of triangles carried along the frontier and coast lines.

The distance, however, between the principal meridional chains was subsequently increased to from 2° to 3°.

The reduction of observations is well advanced, but about one-half still remains for completion.

Topographical Survey Branch.

Originally the maps of the Indian districts were based on military route surveys, but subsequently, detailed topographical surveys were commenced based upon triangulation.

These surveys are mainly for the measurement and delineation of natural features in wild districts or native States of small value as regards revenue, where only a military map on a smaller scale is required.

They are usually made on a scale of 1 inch to the mile.

The Pegu survey of the Nizam's dominions, on a scale of 4 inches to the mile, is distinct from the ordinary topographical surveys.

It was commenced in 1854, and is under local administration.

Revenue Surveys.

The revenue surveys of India, commenced in 1823, are conducted with a view to the fiscal administration of the country. By this means the wealth of the various provinces is ascertained, as well as their food-producing capabilities, and their power to bear taxation.

Their special province is to define the boundaries of estates. They are usually made on a scale of 4 inches to the mile, and on larger scales.

Cadastral field surveys were inaugurated in 1871-2, and were commenced in the north-west provinces.

Geological Survey.

The geological official survey of India was commenced in 1855. The maps are published in the Memoirs and Records of the Geological Survey of India. The survey is still in progress.

Civil Divisions.

Three-fifths of the Empire of India is divided for administrative purposes into 8 provinces, 3 of which are commonly termed presidencies. The provinces are subdivided into divisions or collectorates.

The remaining two-fifths are made up of native feudatory States, about 800 in number, of which only about 200 are of any importance.

Military Divisions.

For military purposes India is divided into 3 Presidencies, which are sub-divided into 36 divisions and districts.

Area.

British India	870,379	square miles.
Native States	608,222	„ „
	1,478,601	

Measures of Length and Surface in India.

The units of measure in India are innumerable, and the same designation has different values in different parts.

The Guz (lineal) varies in different localities from 23 to 36 inches; the Beegah (superficial), which is different for almost every district, varies from about 1,600 sq. yards to 4,840 sq. yards (1 English acre).

English equivalents are coming into use in large towns.

MEASURES OF LENGTH.

Bengal.

Measures.								English Equivalents.		
Yojan or Jojun.	Coss.	Calcutta Coss.	Bengal Coss or Mile.	Russee or Rasi.	Danda, Fathom or Bám.	Guz or Yard.	Háth, Hât'h, or Cubit.	Inches.	Yards.	Miles.
1	4	7·361	8	400	8000	16000	32000	576000	16000	9·0909
	1	1·84	2	100	2000	4000	8000	144000	4000	2·2727
		1	1·08	54	1080	2160	4320	77760	2160	1·2273
			1	50	1000	2000	4000	72000	2000	1·136
				1	20	40	80	1440	40	·022727
					1	2	4	72	2	.0011363
						1	2	36	1	·000568
							1	18	·5	·000284

North West Provinces.

Measures.			English Equivalents.	
Jarib.	Bans or Ganteh.	Ilahi Guz.	Inches.	Yards.
1	20	60	1980	55
	1	3	99	2·75
		1*	33	·91

* Used in the Government surveys.

Madras.†

Measures.								English Equivalents.		
Kâdam.	Coss.	Nâlli Valli.	Thundum or fathom.	Baum or fathom.	Guz.	Moolum or cubit or covid.	Ungulum.	Inches.	Yards.	Miles.
1	4	7	8800					633600	17600	10
	1	1·75	2200					158400	4400	2·5
		*1	1257·143					90514·296	2514·286	1·43
			1					72	2	—
				1				78	2·166	—
					1			23 (about)	—	—
						1	24	18 to 21	—	—
							1	·75 to ·875	—	—

* Distance walked in 24 minutes.

† The English foot and yard are now generally used.

Bombay.

Measures.					English Equivalents.	
Guz.	Hâth or Hât'h.	Venth or Vent'h.	Tussoo.	Ungulee.	Inches.	Feet.
1	1·5	3	24	48	27	2·25
	*1	2	16	32	*18	1·5
		1	8	16	9	·75
			1	2	1·125	·093
				1	·562	·046

* The Hath is given by Capt. Jervis as equal to 19·2 inches.

MEASURES OF SURFACE.

Bengal.

Measures.						English Equivalents.	
Orissa Beegah.	Tirhut Beegah.	Beegah.	Cottah.	Chittack.	Gandeh or Square Hath.	Square Yards.	Acres.
1	1·1455	3·025	—	—	—	4840	1
	1	2·64	—	—	—	4225	·8729
		1	20	320	*6400	1600	·3306
			1	16	320	80	·016529
				1	20	5	·00103
					1	·25	·00005

* 80 Haths square.

North-West Provinces.

Measures.									English Equivalents.	
Benares & Gazipur Beegah.	Agra Beegah.	Delhi Beegah.	Biswa.	Biswansi.	Kachwansi.	Saswansi or Tanwansi.	Uswansi or Nanwansi.	Square Illahi Guz.	Square Yards.	Acres.
1	1·137	1·036	—	—	—	—	—	—	3136	·647934
	1	·911	—	—	—	—	—	—	2756·25	·5694
		1	20	400	8000	160000	3200000	3600	3025	·625
			1	20	400	8000	160000	180	151·25	·03125
				1	20	400	8000	9	7·5625	—
					1	20	400	·45	·37812	—
						1	20	·0225	·0189	—
							1	·001125	·000945	—
								1	·8403	—

Madras.

Measures.				English Equivalents.	
Cawnie or Casseney or Acre.	Anna.	Ground or Maony or Maunie.	Goolie or Coolie or Goontel.	Square yards.	Acres.
1	16	24	100	6400	1·3223
	1	1·5	6·25	400	·0826
		1	4·1666	266·666	·0551
			1	64	·013223

NOTE.—1 Cawnie = 4 Bengal Beegahs.

Bombay.

Measures.								English Equivalents.	
Chakur.	Acre.	Beegah.	Pund.	Goontah or Gunta or chain.	Kuttie or Kuthi.	Square Háth of 19·2 in. English.	Anna or Link.	Square yards.	Acres.
1	96·63036	120	2400	3865·214	28000	1633142·4	61843·43	467690·64	96·63036
	1*	1·242	24·83	40	596·6	16901	640	4840	1
		1	20	32·21012	400	13609·52	515·3619	3897·422	·805253
			1	1·61048	20	680·476	25·767	194·871	·040262
				1*	14·915	422·5	16	121	·025
					1	34·0238	1·238	9·743554	·00201813
						1	·03787	·28444	—
							1*	7·56	—

* Used in the Revenue surveys.

Gugerat.

Measures.						English Equivalents.	
Beegah.	Vaso.	Vishwasi.	Padat.	Padtal.	Khund.	Square yards.	Acres.
1*	20	400	8000	160000	3200000	3025	·625
	1	20	400	8000	160000	151·25	·03125
		1	20	400	8000	7·5625	—
			1	20	400	·37812	—
				1	20	·0189	—
					1	·000945	—

* Same value as the Delhi Beegah, N.W. Provinces.

NOTE.—The following are of equal value, viz. :—

N.-W. Provinces.		*Gugerat.*
Beegah ..	.. =	Beegah.
Biswa ..	.. =	Vaso.
Biswansi..	.. =	Vishwasi.
Kachwansi	.. =	Padat.
Saswansi..	.. =	Padtal.
Nanwansi	.. =	Khund.

GOVERNMENT MAPS OF INDIA.

Longitude is reckoned from Greenwich.

Description.	Principal Scales.	By whom published.	Remarks.
Great Trigonometrical survey of India, chart of.	$\frac{1}{253440}$ $\frac{1}{506880}$ $\frac{1}{6082560}$	Surveyor-General.	
Topographical surveys	$\frac{1}{15840}$ $\frac{1}{31680}$ $\frac{1}{63360}$* $\frac{1}{126720}$ $\frac{1}{253440}$	ditto	* For non-revenue-paying districts, very jungly and hilly tracts, and Native States, Topographical Surveys are mostly on this scale, $\frac{1}{63360}$.
Revenue survey	$\frac{1}{15840}$	ditto	For village plans.
Cadastral survey ..	$\frac{1}{3960}$ $\frac{1}{7920}$	ditto.	

Description.	Principal Scales.	By whom published.	Remarks.
Khusrah	$\frac{1}{3960}$	Surveyor-General	Used by the Settlement Department for the native measurement of fields.
Estates survey	$\frac{1}{3168}$	ditto.	
Districts and military districts.	$\frac{1}{3960}$ $\frac{1}{10560}$ $\frac{1}{31680}$ $\frac{1}{63360}$ $\frac{1}{126720}$ $\frac{1}{253440}$	ditto.	
Pergunnah, Tehseel, Talooqua.*	$\frac{1}{63360}$	ditto.	* Comparable to an English hundred.
Plans of towns, civil and military stations, forts, and native cities	$\frac{1}{500}$ $\frac{1}{2640}$ $\frac{1}{5280}$ $\frac{1}{7920}$ $\frac{1}{10560}$	ditto.	
General map of India ..	$\frac{1}{2027520}$	ditto	In six sheets.
Ditto ..	$\frac{1}{4055040}$	ditto	In two sheets. 1880.
Great atlas of India (Grand Trigonometrical Survey).	$\frac{1}{253440}$	ditto	In 183 sheets, of which about 80 are published.
Presidencies ..	$\frac{1}{63360}$ $\frac{1}{253440}$ $\frac{1}{380160}$ $\frac{1}{506880}$ $\frac{1}{2027520}$	ditto.	Postal map.
Provinces	$\frac{1}{63360}$ $\frac{1}{126720}$ $\frac{1}{253440}$ $\frac{1}{506880}$ $\frac{1}{1013760}$	ditto.	
Frontiers	$\frac{1}{63360}$ $\frac{1}{253440}$ $\frac{1}{380160}$ $\frac{1}{2027520}$	ditto.	
Railways	$\frac{1}{1013760}$	ditto.	
	$\frac{1}{4055040}$	ditto	In one sheet.
	$\frac{1}{7920000}$	ditto	ditto.
Telegraphs	$\frac{1}{4118400}$	ditto	In two sheets.

CONVENTIONAL SIGNS ON THE INDIAN SURVEYS. THE GRAND TRIGONOMETRICAL, TOPOGRAPHICAL, AND REVENUE. (*See* Plate X.)

1. City or town—*col. lake.*
2. Village—*col., houses and roads, burnt sienna*; *trees, green.*
3. Haut or bazaar (market)—*col. lake.*
4. *Pucka fort—*col. lake.*
5. Mud fort—*col. burnt sienna.*
6. *Pucka houses—*col. lake.*
7. Pagoda or Hindoo temple—*col. lake.*
8. Musjid or Mahomedan temple—*col. lake.*
9. Salt golahs—*col., roof, burnt sienna.*
10. Dak bungalow—*col., roof, lake.*
11. Indigo factory—*col., roof, Prussian blue.*
12. Silk factory—*col., roof, burnt sienna.*
13. Sugar factory—*col., chimney and roof, lake.*
14. Burial ground—*col. burnt umber.*
15. *Pucka well—*col. lake disc, filled with blue.*
16. *Kucha well—*col. burnt sienna disc, filled with blue (smaller).*
17. Dep$^{y.}$ Mag$^{t.}$ and Moonsiff's kutchery—*col., flag blue.*
18. Thannah and police chowkey—*col., flag, gamboge.*
19. Sub-division head quarters—*col., flag, lake.*
20. Signal staff—*col., flag, lake.*
21. Lighthouse—*col. lake.*
22. *Pucka semaphore or telegraph—*col. lake.*
23. Boundary or revenue survey pillar—*col. lake.*
24. Ditto ditto wooden post—*col. burnt umber.*
25. Principal stations of Grand Trigonometrical Survey—*col. lake.*
26. Secondary ditto ditto *ditto*
27. High road—*col. light red.*
28. Village road—*col. burnt sienna.*
29. Footpath—*col. burnt sienna.*
30. Railroad with stations—*col., station, lake.*
31. Bunds (embankments).
32. *Pucka bridge—*col. lake.*
33. Wooden bridge—*col. burnt umber.*
34. Sluice gate—*col. lake.*
35. Iron suspension bridge.
36. Nuddee (stream or river)—*col. blue.*
37. Ferry.
38. River—*col. blue.*
39. Paun garden—*col. green, with burnt umber boundaries.*
40. Garden—*col. green.*
41. Mangoe tope—*col., trees, green.*
42. Tamarind trees *ditto.*
43. Palmyra or tar trees—*col., trees, green.*
44. Cocoanut trees *ditto.*

*** Pucka means masonry. Kucha means clay built.**

45. Date trees—*col. green.*
46. Betel-nut trees, *ditto.*
47. Bamboo jungle—*col. green, with tops burnt umber.*
48. Forest ditto.—*col., trees, green.*
49. Low ditto *ditto.*
50. Jhow ditto *ditto.*
51. Grass ditto.—*col., grass green.*
52. Waste or grazing ground—*col. green.*
53. Salt waste—*col. light red.*
54. Ditto with jungle intermixed—*col. light red.*
55. Salt pans—*col., outline, blue.*
56. Ravines.
57. Jheel.
58. Lake or tank—*col. blue.*
59. Chur or sandbed—*col. ochre.*
60. High ground.
61. Sand hills—*col. light red.*
62. Hills, ridge with peaks.
63. Ridge.

For Village Plans.

64 (i). Cultivation, dry—*col., light red.*
    (ii). Ditto wet *ditto.*
65. Lately thrown out of cultivation—*col. green; plants, burnt umber.*
66. Fit for cultivation—*col. green.*
67. Large towns of 2,000 houses.
68. Smaller or pergunnah towns, 1,000 to 2,000 houses.
69. Noted places or villages, 250 to 1,000 houses.
70. Villages under 250 houses.
71. Pergunnahs.
72. Districts.

Colours used are Indian ink, Prussian blue, lake, light red, burnt sienna, gamboge; umber, made from burnt sienna and Indian ink; ochre, made from light red and gamboge; green, made from Prussian blue and gamboge.

ITALY.

Previous to the year 1861 the principal maps of Italy were executed by Austria, but their excellence was greatly due to the "Deposito di Guerra," at Milan. When the Austrians took possession of Lombardo-Venetia the Deposito di Guerra was reorganised, and became the "Istituto Geografico." It remained at Milan until 1839, when it was moved to Vienna, and grew into the Austrian Geographical Institute. Other maps were also published by States and by private firms.

When the new kingdom of Italy became consolidated, the need arose for a systematic survey of the kingdom, to absorb the maps already existing into a whole on one scale. The scale of $\frac{1}{50000}$ was adopted, except for more important portions, for which the scale of $\frac{1}{25000}$ was used. Since 1865 the survey has proceeded on the lines proposed at the International Commission for the measurement of a degree, held at Berlin in October, 1864, and has been executed by the Military Topographical Institute at Florence. Each State forming the kingdom of Italy originally had its own Topographical Institute, but in 1873 they were all consolidated into that at Florence. The materials they brought were on various scales and systems, and there were many gaps requiring to be filled up.

Geological Surveys.

Geological surveys are executed under Government by the R. Comitato Geologico d' Italia.

Civil Divisions.

For administrative purposes Italy is divided into 69 provinces, which are sub-divided into communes.

Military Divisions.

For military purposes Italy is divided into 10 Army Corps commands, which are sub-divided into 20 Divisional Commands. These comprise 88 military districts (distretto militare), each of which consists of from 1 to 5 political districts (bezirk, mundamenti).

Area.

Its area is 114,415 square miles.

Measures of Length and Surface.

Italy has adopted the metric system of measures (*see* France).

Comparison of the Old and New Measures of Length.

Venetian Lombardy.

Old Measure.													New Measure.	English Equivalents.		
Miglio Old System.	Miglio Decimal System.	Metro or Braccio Decimal System.	Braccio Old System.	Piede Old System Milan Foot.	Venice Foot, Old System.	Piede Decimal System.	Palmo Decimal System.	Oncia Old System.	Dito Decimal System.	Punto Old System.	Atomo Decimal System.	Atomo Old System.	Metres.	Inches.	Feet.	Miles.
1	1·78457	1784·571	3000	4500	5132·21	6848	17845·71	36000	178457·1	432000	1784571	5184000	1784·571	70260	5855	1·109
	1*	1000	1681·07	2521·6	2876	3278	10000	20172·84	100000	242074	1000000	2904888	1000	39370·79	3280·88	·62138
		1	1·68107	2·5216	2·876	3·278	10	20·1728	100	242·074	1000	2904·888	1	39·37079	3·28088	·00062138
			1	1·5	1·7107	2·282	5·946	12	59·49	144	594·9	1728	·5949	23·42	1·95	—
				1	1·1405	1·3	3·967	8	39·67	96	396·7	1152	·3966	15·62	—	—
					1	1·14	3·477	7	34·77	84	347·7	1008	·3472	13·69	—	—
						1	3·05	5·26	30·5	63·12	305	757·44	·305	10·26	—	—
							1	2·01728	10	24·20736	100	290·4888	·1	3·937079	—	—
								1	4·96	12	49·6	144	·0496	1·95	—	—
									1	2·420736	10	29·0488	·01	·3937079	—	—
										1	4·13	12	·0041	·1625	—	—
											1	2·90488	·001	·03937079	—	—
												1	·0004	·0135	—	—

NOTE.—The *Decimal System* was introduced in 1803; the *Old System* was used prior to that date.

* Kilometre.

Modena.

Old Measure.					New Measure.	English Equivalents.	
Cavezzo.	Braccio.	Piede.	Punto.	Linea.	Metres.	Inches.	Yards.
1	5	6	72	864	3·138164	123·552	3·432
	*1	1·1907	14·2884	171·4608	·627633	24·519	—
		1	12	144	·523028	20·5920	—
			1	12	·043585	1·7160	—
				1	·003632	·1430	—

* The Braccio is equal to 2½ Genoa Palmi.

Naples and Sicily.

Old Measure.									New Measure	English Equivalents.		
Miglio.	Catena.	Canna.	Pertica or Passo.	Braccio.	Palmo.	Oncia.	Minuto.	Linea.	Metres.	Inches.	Yards.	Miles.
1	117·474	875	933·3	2643·5	7000	84000	420000	1008000	1845·9	72674	2018·722	1·147
	1	7·45	7·945	22·656	59·59	715·08	3575·4	8581	15·71577	618·6408	17·1844	—
		1	1·066	3·021	8	96	480	1152	2·1095	83·055	2·307	—
			1	2·832	7·5	90	450	1080	1·98	77·865	2·163	—
				1	2·648	31·776	158·88	381·312	·6985	27·5	—	—
					1	12	60	144	·2637	10·382	—	—
						1	5	12	·0219	·8651	—	—
							1	2·4	·0044	·173	—	—
								1	·0018	·0721	—	—

Parma.

Old Measure.							New Measure.	English Equivalents.	
Miglio.	Pertica.	Pié or Foot.	Braccio di Legno.	Oncia.	Punto.	Atomo.	Metres.	Inches.	Yards.
1	455·12	—	—	—	—	—	1480·3	58284	1619
	1	5·7	6	72	864	10368	3·2521	128·04	3·56
		*1	1·051	12·612	151·344	1816·128	·56964	22·428	—
			*1	12	144	1728	·542	21·344	—
				1	12	144	·0451	1·78	—
					1	12	·0038	·148	—
						1	·00032	·0124	—

* Used in surveying.

Piedmont.—Turin.—Genoa.

Old Measure.													New Measure.	English Equivalents.	
Post.	Miglio.	Pertica.	Trabucca or Tesa.	Canna grossa.	Raso or ell.	Braccio.	Piede Liprando	Piede Manuale.	Palmo.	Oncia.	Punto.	Atomo.	Metres.	Inches.	Miles.
Pied-mont. Turin. Genoa.	Pied-mont. Turin. Genoa.	Pied-mont. Turin.	Pied-mont. Turin.	Genoa.	Pied-mont. Turin.	Genoa.	Pied-mont. Turin. Genoa.	Pied-mont. Turin. Genoa.	Genoa.	Pied-mont. Turin. Genoa.	Pied-mont. Turin. Genoa.	Pied-mont. Turin. Genoa.			
1	3·5	—	—	—	—	—	—	—	34125	—	—	26208000	7796·8	306950·4	4·8445
	1	361·$\dot{1}$	722·$\dot{2}$	812·5	3714·28	4178·5	4333·$\dot{3}$	6500	9750	52000	624000	7488000	2226·39	87654·6659	1·3835
		1	2	2·25	10·284	11·571	12	18	27	144	1728	20736	6·7248	264·816	—
			1	1·125	5·142	5·785	6	9	13·5	72	864	10368	3·3624	132·408	—
				1	4·57	5·1428	5·$\dot{3}$	8	12	64	768	9216	2·9892	117·69	—
					1	1·1249	1·166	1·75	2·625	14	168	2016	·6538	25·746	—
						1	1·037	1·555	2·$\dot{3}$	12·44	149·33	1792	·581	22·8814	—
							1	1·5	2·25	12	144	1728	·5604	22·068	—
								1	1·5	8	96	1152	·3736	14·712	—
									1	5·$\dot{3}$	64	768	·2491	9·8076	—
										1	12	144	·0467	1·839	—
											1	12	·0039	·153	—
												1	·00032	·0127	—

NOTE.—*The Post* is equal to 4,000 French toises (ancient).

Tuscany.

Old Measure.							New Measure.	English Equivalents.		
Post Miglio.	Miglio.	Cavezzo.	Canna Surveyor's or Pertica.	Passo.	Braccio.	Palmo.	Metres.	Inches.	Yards.	Miles.
1	8	3777·77	4533·33	7555·55	22666·6̇	45333·33	13232·96	520992	14472	8·2217
	1	472·2̇	566·6̇	944·4̇	2833·3̇	5666·6̇	1654·12	65124	1809	1·0277
		1	1·2	2	6	12	3·5	137·76	3·827	—
			1	1·83̇	5	10	2·916	114·9	3·1916	—
				1	3	6	1·75	68·88	—	—
					1	2	·583	22·96	—	—
						1	·291	11·48	—	—

Rome.

Old Measure.					New Measure.	English Equivalents.			
Post Miglio.	Miglio or Roman Mile.	Ancient Millarium.	Passo.	Old Foot.	Metres.	Inches.	Feet.	Yards.	Miles.
1	8	8·0744	8074·4	40372	11908·93	468864·25	39072	13024	7·4
	1	1·0093	1009·3	5046·5	1488·62	58608	4884	1628	·925
		1	1000	5000	1474·9005	58068	4839	1613	·9169
			1	5	1·4749005	58·068	4·839	—	—
				1	·2949801	11·6136	—	—	—

COMPARISON OF THE OLD AND NEW MEASURES OF SURFACE.

Venetian Lombardy.

Old Measure.					New Measure.	English Equivalents.	
Pertica.	Tavola or Tornatura.	Tavola.	Square Cavezzo.	Square Palmo.			
Old System.	Decimal System.	Old System.	Old System.	Decimal System.	Ares.	Square Yards.	Acres.
1	6·51936	24	96	651·936	6·51936	779·76	·1611
	1	3·68	14·72	100	1	119·6033	·02471143
		1	4	27·164	·27164	32·49	·006713
			1	6·791	·06791	8·1225	·001676
				1	·01	1·196033	—

Note.—The decimal system was introduced in 1803; the old system was used prior to that date.

Modena.

Old Measure.				New Measure.	English Equivalents.		
Biolca.	Tavola.	Square Cavezzo.	Square Piede.	Ares.	Square Inches.	Square Yards.	Acres.
1	72	288	10368	28·362	—	3392·243712	·700876
	1	4	144	·393923	61060·386816	47·114496	·0097
		1	36	·098481	15265·096704	11·778624	—
			1	·002735	424·030464	·32718	—

Naples.

Old Measure.			New Measure.	English Equivalents.	
Mòggio.	Square Passo.	Square Palmo.	Ares.	Square Yards.	Acres.
1	900	50625	35·2024	4210·329375	·87
	1	56·25	·03911	4·6781	·000917
		1	·000695	·083167	—

Parma.

Old Measure.					New Measure.	English Equivalents.	
Biolca.	Staro	Tavola.	Square pertica.	Square braccio.	Ares.	Square yards.	Acres.
1	6	72	288	10368	30·472956	3644·66729	·75303
	1	12	48	1728	5·078826	607·4445	·1255
		1	4	144	·423235	50·620379	·0105
			1	36	·105809	12·65509	·0026
				1	·002939	·351530419	·00007

Piedmont—Turin.

Old Measure.				New Measure.	English Equivalents.	
Giornata.	Tavola or square pertica.	Square trabucco.	Square Piede liprando.	Ares.	Square yards.	Acres.
1	100	400	14400	45·24	5411·0736	1·118
	1	4	144	·4524	54·110736	·01118
		1	36	·1131	13·527684	·00279
			1	·0031	·375769	·000077

Genoa.

Old Measure.				New Measure.	English Equivalents.	
Starello.	Millier.	Corbula.	Imbuto.	Ares.	Square yards.	Acres.
1	2·3034	4	16	39·6728	4745	·98037
	1	1·7365	6·946	17·2236	2060	·4256
		1	4	9·9182	1186·25	·24509
			1	2·4795	296·56	·06127

Tuscany.

Old Measure.							New Measure.	English Equivalents.	
Saccato.	Quadrato.	Stafolo.	Stioro.	Panoro.	Square Pertica.	Square Braccio.	Ares.	Square Yards.	Acres.
1	1·651	10	13·75	165	660	16500	56·2105	6722·9649696	1·38904
	1	6·06	8·3̇	100	400	10000	34·0668	4074·52	·8413
		1	1·375	16·5	66	1650	5·62105	672·29649	·138904
			1	12	48	1200	4·089016	488·942906	·101021232
				1	4	100	·340668	40·7452422	·008418436
					1	25	·085167	10·18631056	·002104609
						1	·00340668	·407452	—

Rome.

Old Measure.				New Measure.	English Equivalents.	
Rubbio.	Guarta.	Pezza.	Scorzo.	Ares.	Square Yards.	Acres.
1	4	7	16	184·744024	22096	4·565
	1	1·75	4	46·186006	5524	1·141
		1	2·285714	26·392003	3156·5	·652
			1	11·5465	1381	·2852

GOVERNMENT MAPS OF ITALY.

Longitude is reckoned from Rome (Monte Mario), which is 12° 28′ E. of Greenwich, except in those Maps executed by Austria when her dominion extended into Italy, in which cases longitude is reckoned from Ferro, 18° 9′ W. of Greenwich.

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Map of Italy ..	$\frac{1}{25000}$	1880	In progress.	——	
Sardinia	$\frac{1}{50000}$	1852 to 1871	91	Military Topographical Institute at Florence.	Lithographed.
Ditto	$\frac{1}{250000}$	1842 to 1352	6	ditto	Copper engraved.
Ditto	$\frac{1}{500000}$	1846	1	ditto	ditto.
South Italy and Sicily.	$\frac{1}{50000}$	1875 to 1877	177	ditto.	
Map of Sicily ..	$\frac{1}{100000}$	1871	51	ditto	Heliographed.
North and Central Italy.	$\frac{1}{50000}$	..	..	ditto.	
Map of Italy ..	$\frac{1}{100000}$	In hand.	56 to 1881	ditto	Heliographed. To be completed in 277 sheets. This map will absorb all others. Vertical hachures with contours.
Chorographic map of Italy.	$\frac{1}{500000}$	..	24	ditto	Heliographed, in 24 sheets.
Ditto	$\frac{1}{600000}$	1876	6	ditto	Copper engraved.
Road and railway map.	$\frac{1}{1000000}$	1875	6	ditto	Chromo-lithographed.
Railways	$\frac{1}{6000000}$	1869	1	ditto	In 3 colours.
Military districts ..	$\frac{1}{1000000}$	1874	4	ditto	Chromo-lithographed.
States of the Church (S.E. portion).	$\frac{1}{80000}$	1856	4	Depôt de la Guerre at Paris.	
Neapolitan Provinces.	$\frac{1}{250000}$	1874	25	Shrenk.	
States of the Church and Tuscany.	$\frac{1}{86400}$	1851 to 1856	52	Military Geographical Institute at Vienna; at Milan before 1839.	Engraved on stone.
Lombardy and Venetia.	$\frac{1}{86400}$	1833 to 1838	42	ditto	Copper engraved. Lombardy alone, in 24 sheets.
Ditto	$\frac{1}{288000}$	1838	4	ditto.	
Modena	$\frac{1}{864000}$	1849	9	ditto	Copper engraved.
Parma, Plaisance, and Guastalla.	$\frac{1}{864000}$	1821 to 1822	9	ditto.	

CONVENTIONAL SIGNS ON THE MAP OF ITALY $\frac{1}{100,000}$.

(*See* Plate XI.)

1. Railway.
2. Bridge over railway.
3. Level crossing.
4. Bridge under railway.
5. Railway station.
6. Railway tunnel.
7. Narrow gauge railway or tramway.
8. Street railway.
9. 1st class road.
10. 2nd ditto, between chief towns of provinces.
11. 3rd ditto.
12. 4th ditto, not practicable at all seasons.
13. Country road.
14. Track.
15. Bridle path.
16. Footpath.
17. Difficult footpath.
18. Road in cutting.
19. Road embanked.
20. Boundary of state.
21. Boundary of province.
22. Boundary of district.
23. Boundary of cultivation.
24. River.
25. Torrent.
26. Canal.
27. Stream or ditch.
28. Aqueduct.
29. Aqueduct, ruined.
30. Aqueduct, subterranean.
31. Causeway or bank.
32. Masonry bridges.
33. Iron bridges.
34. Suspension bridges.
35. Wooden bridges.
36. Bridges of boats.
37. Foot bridges.
38. Ford for carriages.
39. Ford for horses.
40. Ford for men.
41. Raft or skiff ferry.
42. Boat ferry.
43. Water or fish weir.
44. Floating mill.
45. Commencement of navigability for rafts.
46. Navigation commences.
47. Isolated buildings.
48. Ruin.
49. Cemetery.

50. Church among houses.
51. Isolated churches.
52. Chapel, cross.
53. Fountain, well, cistern.
54. Mill.
55. Windmill.
56. Trigonometrical point.
57. Graphical point (auxiliary).
58. Meadows or natural pastures.
59. Vineyards.
60. Uncultivated ground.
61. Quarries.
62. Cement diggings.
63. Peat holes.
64. Common.
65. Houses and gardens.
66. Woods.
67. Bog and rice field.
68. Cultivated lands.
69. Saltpans and coast.

Abbreviations used on the Map of Italy, $\frac{1}{100000}$.

Abb$^{\text{a.}}$	Abbey.
Batt$^{\text{a.}}$	Battery.
C.	House.
C$^{\text{na.}}$	Pasture ground.
Cast$^{\text{o.}}$	Castle.
Cas$^{\text{o.}}$	Country seat.
Ct$^{\text{o.}}$	Small house.
Conv$^{\text{to.}}$	Convent.
Fort$^{\text{no.}}$	Redoubt.
F.	Fort.
Forn$^{\text{ce.}}$	Kiln.
Mass$^{\text{a.}}$	Farm.
Mad$^{\text{na.}}$	Church (Madonna).
Osp$^{\text{o.}}$	Hospice.
Ost$^{\text{a.}}$	Hotel.
Pod$^{\text{e.}}$	Estate.
Polv$^{\text{a.}}$	Powder magazine.
P$^{\text{te.}}$	Bridge.
S.	St.
Sant$^{\text{o.}}$	Sanctuary.
Staz$^{\text{e.}}$	Station.
T$^{\text{re.}}$	Tower.
V$^{\text{la.}}$	Country house.
V$^{\text{no.}}$	Small country house.
M$^{\text{o.}}$	Mill.
Font$^{\text{le.}}$	Spring.
Font$^{\text{na.}}$	Spring.
P$^{\text{zo.}}$	Well.

Sorg$^{\text{te.}}$	Source.
B.	Wood forest.
R.	Region.
R$^{\text{va.}}$	Reserve.
Ten$^{\text{ta.}}$	A "holding."
F$^{\text{do.}}$	Fief.
L.	Lake.
F.	River.
F$^{\text{ra.}}$	River (which overflows)
Can$^{\text{le.}}$	Canal.
R.	Stream.
F$^{\text{so.}}$	Ditch.
Pant$^{\text{no.}}$	Marsh.
T.	Torrent.
V$^{\text{le.}}$	Valley.
V.	Bastion.
C.	Cape.
G.	Gulf.
I.	Island.
P.	Point.
M$^{\text{gna.}}$	Mountain range.
M.	Mountain.
C$^{\text{ta.}}$	Coast.
P$^{\text{so.}}$	Pass.
C$^{\text{le.}}$	Hill.
Port$^{\text{lla.}}$	Gate.
C$^{\text{zo.}}$	Spur.
C$^{\text{ma.}}$	Summit.
P$^{\text{co.}}$	Peak.
P$^{\text{ta.}}$	Point.
Punt$^{\text{ne.}}$	Point.
P$^{\text{gio.}}$	Cliff.
R$^{\text{ca.}}$	Rock.
R$^{\text{oe.}}$	Rocks.
P$^{\text{no.}}$	Plain.

THE NETHERLANDS.

There are two Government establishments in the Netherlands for the preparation of maps, viz.:—

The Topographical Department of the Hague for maps of all descriptions and the *Topographical Department of Batavia*, the principal work of which is to make colonial surveys, which are transmitted to the Cartographic Department at the Hague to be formed into maps.

The Topographical Department of the Hague is famed for its beautiful maps produced in colours. They are executed by the process "Eckstein," named after the Director of the Office, the Inventor. Hill features are shown by every combination of blue, yellow, and red, in all their varying shades.

Civil Divisions.

The Netherlands are divided into 11 Provinces, exclusive of the Grand Duchy of Luxemburg (a fief under separate administration).

Military Divisions.

For military purposes, the Netherlands are divided into three military districts (Afdeelingen).

Area.

Area of the 11 provinces, 12,712 square miles; Luxemburg, 995 square miles.

MEASURES OF LENGTH AND SURFACE.

The French metric system was adopted in the Netherlands in 1821. The old Dutch denominations, as given below, being applied to the new measures.

Measures of Length.

Streep = millimètre (mm).
Duim. = centimètre (cm).
Palm. = decimètre (dm).
El. = mètre (m).
Roede. = decamètre.
Mijl. = kilomètre (km).

Measures of Surface.

Vierkante streep = sq. millimètre.
„ duim. = sq. centimètre.
„ palm. = sq. decimètre.
Vierkante El. = centiare (m^2).
Vierkante Roede = are (a).
Bunder = Hecktar (ha).

Since the 1st July, 1870, the metric denominations have been used.

GOVERNMENT MAPS OF THE NETHERLANDS.

(Longitude is reckoned from Amsterdam, which is 4° 53′ E. of Greenwich.)

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
The Netherlands (Staff map).	$\frac{1}{50000}$	1850 to 1864	62	Topo. Dept. at the Hague.	Lithographed. Altitudes in metres. Features of the ground represented by vertical hachures according to scale of shade.
Java and Madura	$\frac{1}{100000}$	In hand.	..	do.	Chromo-lithographed. Roads and railways, crimson lake; water, blue; hachures, brown; cultivation, coloured appropriately. The writing by typo-autography.
The Waaterstaats map of the Netherlands.	$\frac{1}{50000}$	In hand.	100 (1881)	do.	In 240 sheets, chromo-lithographed.
Utrecht and its environs.	$\frac{1}{50000}$	..	..	do.	Lithographed.
Kraton, Acheen ..	$\frac{1}{4000}$				
Acheen	$\frac{1}{40000}$				
Topographical and military map of Holland.	$\frac{1}{25000}$	In hand.	..	do.	Engraved on stone. To be completed in 776 sheets, printed in colours. [Not for sale.]
River map of Holland.	$\frac{1}{10000}$	..	..	do.	
Topographical atlas of the Netherlands.	$\frac{1}{200000}$	1875	19	do.	In 19 sheets.
Ditto	$\frac{1}{400000}$	1877	..	do.	
Ditto	$\frac{1}{600000}$	1868	..	do.	
Telegraph map ..	$\frac{1}{250000}$	..	..	do.	
Posting map ..	$\frac{1}{250000}$	..	..	do.	
Residencies and Districts in Java, Madura, Sumatra, &c.	$\frac{1}{100000}$	..	..	Ditto, from surveys by the Topographical Department of Batavia.	Chromo-lithographed.

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
New Ordnance Map of Java and Madura.	$\frac{1}{500000}$	..	..	Topo. Dept. at the Hague, from surveys by the Topographical Department of Batavia.	Chromo-lithographed.
Chief Towns ..	$\frac{1}{20000}$	..	..	do.	
Kingdom of Deli	$\frac{1}{100000}$	..	..	do.	
Acheen	$\frac{1}{50000}$	1880	..	do.	
Theatre of War in Acheen.	$\frac{1}{20000}$	..	..	do.	Printed in colours.
Island of Billiton	$\frac{1}{200000}$	..	..	do.	

CONVENTIONAL SIGNS ON THE TOPOGRAPHICAL AND MILITARY MAP OF THE NETHERLANDS. $\frac{1}{50000}$. (*See* Plate XII.)

1. Town with 50.000 inhabitants and over (name printed in 2-line long primer characters).
   Town with 20,000 inhabitants and over (name printed in 2-line minion characters).
   Town with less than 20,000 inhabitants (name printed in 2-line pearl characters).
2. Village (name printed in pica condensed No. 2).
3. Hamlet (name printed in minion condensed No. 2).
4. Scattered houses.
5. Castle or large country seat with park and lake.
6. Country seat with garden.
7. Farm with kitchen garden and orchard.
8. Chapel or cross.
9. Church and burial-ground.
10. Sheepfold.
11. Tower, a trigonometrical point.
12. Trigonometrical point.
13. Steam mill.
14. Wind mill.
15. Water mill with mill brook.
16. Polder mill with "Bay" and drain.
17. Monument.
18. (1) Glacis in fortifications.
    (2) Crest ditto.
19. (1) Dry ditch ditto.
    (2) Stone dam ditto.

(3) Wet ditch fortifications.
(4) Covered way ditto.
20. Neglected fortifications.
21. Camp with tents or huts.
22. Arable land with hedges.
23. Dry pasture land.
24. Low pasture land with drains.
25. Wild duck decoy.
26. Morass.
27. Low bog with turfpits.
28. Low bog cleared.
29. Wood.
30. High heath.
31. Low heath with turf.
32. High bog with turfpits.
33. Bog clearing.
34. Alluvium.
35. Brook and footbridge.
36. Sandrifts and flats.
37. Dunes.
38. Slopes of ground with altitude in metres.
39. (1) Hollow roads.
(2) Steep and broken slopes.
(3) Rocky and precipitous slopes.
40. (1) Railway embankment.
(2) Railway station.
(3) Railway cutting.
41. (1) High road.
(2) High road milestone.
(3) High road tollgate.
42. (1) Road gravel, macadamised, rubbish or shingle.
(2) Road gravel, with stone bridge and trees.
43, Country road with drains and wooden bridge.
44. Lane with hedges and culvert.
45. Causeway with culvert bridge.
46. Footpath.
47. Signpost.
48. (1) Sea, river and polder dam with sluices.
(2) Overflow.
(3) Roads to mount up to it.
49. Quay or dam with horse path on top and with stone culvert.
50. Dyke as summer quay or dam.
51. Quay or dam with wooden culvert and drain with wharves.
52. Boundary walls of earth.
53. Frontier of kingdom with frontier pole.
54. Province boundary.
55. River.
56. Sailing ferryboat for carriages.
57. Rope ditto ditto
58. Flying bridge.

59. Steam ferry.
60. Sailing ferry.
61. Ferry for foot passengers.
62. Permanent bridges.
63. Bridge of boats.
64. Water-mark scale.
65. Ebb and flow arrow.
66. Current arrow.
67. Dyke with platform and wooden jetty.
68. Dyke with stone jetty.
69. Lighthouse.
70. (1) Beach or shoal, at mean flood tide, above water.
    (2) ditto ditto ditto under water.
71. Cape.
72. Beacon.
73. (1) Line of 25 decimètres depth.
    (2) Line of 50 ditto
    (3) Line of 80 ditto
74. Level of mean ebb and flow tide relatively to that at Amsterdam.
75. Mean summer level relatively to Amsterdam.
76. Canal with lock.
77. Ditto drawbridge.
78. Ditto wooden bridge.
79. Ditto stone bridge.
80. Mill or ordinary drain with stone culvert.

NORWAY.

Maps are published by the Topographical Department of the General Staff.

Geological Survey.

The Geological Survey is conducted by the "Geographical Survey" (Geografiske Opmaaling), the sheets of the Topographical Map $\frac{1}{100000}$ being used upon which to record the results.

Civil Divisions.

Norway is divided into 6 administrative dioceses or provinces, "Stiften"; these are subdivided into 17 "Amts" (counties) or bailiwicks, two of which are North and South portions.

The "Amts" are subdivided in descending order of area into "Fögder" (districts), "Praestegjelds" (parishes), and "Anneks" (communes).

Military Divisions.

For military purposes Norway is divided into 5 Brigade Districts, sub-divided into 20 battalion conscription districts, each of which contains from 2 to 8 muster circles, of which there are 83. These latter are divided again into 204 lot-drawing districts (Lodtrœkningsdistrikter).

Area.

Area, 122,870 square miles.

Measures of Length and Surface.

The metric system was adopted in Norway on 22nd May, 1875 (see France), to be in use at the expiration of 3 years from that date.

COMPARISON OF THE OLD AND NEW MEASURES OF LENGTH.

Old Measure.							New Measure.	English Equivalents.		
Miil.	Stang.	Favn.	Alen.	Fod.	Tomme.	Linie.	Metres.	Inches.	Yards.	Miles.
1	2250	6000	18000	36000	432000	5184000	112983·966	444826·8	12356·3	7·020625
	1	2·6̇	8	16	192	2304	5·0215096	197·7008	5·49169	—
		1	3	6	72	864	1·8830661	74·1378	2·05938	—
			1	2	24	288	·6276887	24·7126	·68646	—
				1	12	144	·31384435	12·3563	·34323	—
					1	12	·02615369	1·0297	·0286	—
						1	·00217947	·0858	·0024	—

The old measures of surface are the squares of the old measures of length.

GOVERNMENT MAPS OF NORWAY.

(*Longitude is reckoned from Christiania, which is* 10° 43′ *E. of Greenwich, except in the "Amt" maps, where it is reckoned from Ferro,* 18° 9′ *E. of Greenwich.*)

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
"Amt" maps of Norway.	$\frac{1}{200000}$	1826 in hand.	..	Topographical Dept. at Christiania.	Plans of larger cities are drawn on the margins on the scale of $\frac{1}{20000}$. Black.
General map of S. Norway.	$\frac{1}{400000}$	1875 in hand	18 in 1878	ditto	Lithographed. Water, blue; roads and towns, red; boundaries and contours, black.
Topographical map of Norway.	$\frac{1}{100000}$	In progress.	..	ditto	Printed in colours. Contours 100 "Fod" apart (31·38 metres).
Geological map of Norway.	$\frac{1}{100000}$	..	In progress,	Geographical Survey.	
Geological map of S. Norway.	$\frac{1}{1000000}$	1877	1	ditto.	

CONVENTIONAL SIGNS ON THE "AMT" (COUNTY) MAPS OF NORWAY. $\frac{1}{200000}$. (*See* Plate XIII.)

1. Loading place for ships.
2. Principal church (parish).
3. Chapel of ease (commune).
4. Quondam nobleman's country seat.
5. Farm (or house).
6. Cottage or pasturage hut
7. Posting station.
8. Captain's house.
9. Vicarage.
10. Cast iron works.
11. Glass works.
12. Copper works.
13. Paper mills.
14. Gunpowder mills.
15. Saw mills.
16. Water mills.
17. Stamping mills.
18. Brick works.
19. Main roads.
20. Country road or large bye road.
21. Small bye road or good bridle path
22. Bridle path.
23. Footpath.
24. Winter road.
25. Frontier of kingdom.
26. County boundary.
27. District boundary.
28. Parish boundary.
29. Commune boundary.
30. Drill ground.
31. Iron forge.
32. Nail forge.
33. Telegraph and station ($\frac{1}{1000000}$ scale).
34. Railway ($\frac{1}{1000000}$ scale).

    No difference is made between narrow and broad gauge, single or double lines.

    In larger scales, viz. $\frac{1}{10000}$ to $\frac{1}{50000}$, however, railways and tramways are shown thus (35 to 36).
35. Single line.
    (*a*) Narrow gauge.
    (*b*) Broad gauge.
36. Double line.
    (*a*) Narrow gauge.
    (*b*) Broad gauge.
37. Railway under construction $\frac{1}{100000}$.
38. Horse tramway ditto
39. ditto under construction $\frac{1}{1000000}$.

NOTE.—these signs will be replaced by those for the $\frac{1}{1000000}$ scale as soon as published.

CONVENTIONAL SIGNS FOR MILITARY WORKS, TROOPS, &c., SCALES $\frac{1}{20000}$ AND SMALLER. (*See* Plate XIII.)

Infantry.

1. A single man.
2. Line of marksmen.
3. Section.
4. Peloton in line.
5. Peloton in flank march.
6. Company in line.
7. Company in flank march.
8. Battalion in line.
9. Battalion in column.
10. Battalion in double column.
11. Battalion in attacking column.
12. Battalion in company columns.
13. Brigade in mass of columns.
14. Brigade in attacking formation.
15. Brigade in column.

Cavalry.

16. Single trooper.
17. Vedette (afmarsch).
18. Troop in line.
19. Troop in flank march.
20. Squadron in line.
21. Squadron in flank march.
22. Squadron in column.

Artillery.

23. Single gun.
24. Division in line.
25. Division in flank march.
26. Battery in line.
27. Battery in flank march.
28. Battery in column.

Engineers.

The same as for Infantry, but with a distinguishing sign, as shown in example.

29. Company in line.

Train.

30. General train.
31. Hospital train.
32. Artillery train (Park, ammunition column).
33. Engineer train.

34. Head-quarters.
35. Divisional head-quarters.
36. Brigade head-quarters.
37. "Intendance."
38. Magazine.
39. Hospital.
40. Dressing station.
41. Etappen station.
42. Alarm place.
43. Camp, bivouack.
44. Direction of march.
45. Road rendered impassable.
46. Torpedoes.
47. Barriers.
48. Sunken obstacles (vessels).
49. Sunken obstacles (stones).
50. Obstacle (felled trees).
51. Cheveaux de frises.
52. Palisades.
53. Rifle pits.
54. Fortifications—Works.
55. Drill ground.
56. Site of battle.

Abbreviations in "Amt" Maps of Norway.

FGD.	Jurisdiction of a Foged (magistrate's district).
PGD.	Parish.
Fj.	Fiord (bay).
S$^{\text{n}}$.	Lakes.
V$^{\text{d}}$.	Water.
Kj.	Pasture.
S$^{\text{r}}$.	Summer mountain pasture.
öv.	Upper.
nd.	Lower.
n.	North.
s.	South.
ö.	East.
v.	West.
st.	Large.
lil.	Small.
Bg.	Mountain.
Fj.	Table land.
E.	River.
H$^{\text{n}}$.	Island.

PORTUGAL.

In Portugal the Minister of Public Works has charge of all Geographical duties.

Maps are constructed and published by the Department of Geographical Works.

The country is surveyed on the scale of $\frac{1}{50000}$, from which maps are reduced to the scales $\frac{1}{100000}$ and $\frac{1}{500000}$.

Civil Divisions.

For administrative purposes Continental Portugal is divided into 8 provinces, sub-divided into 17 districts, and again into parishes "Freguesia."

Military Divisions.

Portugal is divided into 8 military districts, identical with the civil provinces.

Area.

Its area (continental) is 34,654 square miles.

Measures of Length and Surface.

The measures of length and surface have, since the 1st October, 1868, been identical with those of France, but with Portuguese denominations.

DENOMINATIONS.

Length.

Myriâmetro, kilómetro, hectómetro, decâmetro, metro, decimetro, centimetro, millimetro.

Surface.

Sq. myriâmetro .. .. .. = 100 sq. kilómetros.
„ kilómetro .. .. .. = 100 „ hectómetros.
„ hectómetro (French hectare) = 100 „ decâmetros.
„ decâmetro (French are) .. = 100 „ metros.
„ metro (French centiare) .. = 100 „ decimetros.
„ decimetro .. .. .. = 100 „ centimetros.
„ centimetro .. .. .. = 100 „ millimetros.

COMPARISON OF OLD AND NEW MEASURES OF LENGTH.

Old Measure.									New Measure.		English Equivalents.		
Degree of Meridian (mean).	Legoa or League.	Milha or Mile.	Estadio or Furlong.	Braça or Fathom.	Vara or Yard.	Pé or Foot.	Palmo de Craveira.	Pollegada or Inch.	Metros.	Kilómetros.	Inches.	Yards.	Miles.
1	18	54	432	50508	101016	336720	505080	4040640	111116·7	111·1167	4374780	121521·6	69·046
	1	3	24	2806	5612	18706·6̇	28060	224480	6173·15	6·17315	243043·3̇	6751·2027	3·836
		1	8	935·3̇	1870·6̇	6235·552	9353·3̇	74826·6̇	2057·716	2·05771	81014·4̇	2250·4012	1·278637
			1	116·9166	233·83	779·444	1169·1666	9353·3̇	257·214	·25721	10126·8	281·3001	·16
				1	2	6·6̇	10	80	2·2	·0022	86·616	2·406	—
					1	3·3̇	5	40	1·1	·0011	43·308	1·203	—
						1	1·5	12	·33	·00033	12·9924	·3609	—
							1	8	·22	·00022	8·6616	·2406	—
								1	·0275	·000027	1·0827	·0301	—

COMPARISON OF THE OLD AND NEW MEASURES OF SURFACE.

Old Measure.				New Measure.	English equivalents.		
Geira.	Square braça.	Square Vara.	Square palmo de Craveira.	Square Decametros (French are).	Square inches.	Square yards.	Acres.
1	1210	4840	121000	58·56435	9077821·06176	7004·45405	1·4472
	1	4	100	·04840028	7502·331456	5·788805	·001196
		1	25	·01210007	1875·582864	1·447201	—
			1	·000484	75·02331456	·05788805	—

GOVERNMENT MAPS OF PORTUGAL.

Longitude is reckoned from Lisbon, which is 9° 9′ west of Greenwich.

Names of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Cadastral Survey	$\frac{1}{50000}$	..	..	.. ..	Not published.
Map of Portugal (Chorographic)	$\frac{1}{100000}$	1856 in hand	19 (1881)	Minister of Public Works at Lisbon	To be completed in 37 sheets. Printed in black.
Ditto	$\frac{1}{500000}$	1870	1	Ditto	

CONVENTIONAL SIGNS ON THE CHOROGRAPHIC MAP OF PORTUGAL. $\frac{1}{100000}$. (*See* Plate XIV.)

1. Fortified city.
2. Walled city.
3. Open city.
4. Town.
5. Village.
6. Custom house.
7. Factory.
8. Mansion, or large manor house.
9. Large building.
10. Stone or wooden building.
11. Ditto when a trigonometrical point.
12. Parish church in a town.
13. Ditto isolated,
14. Ditto in a town when a trigonometrical point.
15. Ditto isolated ditto ditto

16. Chapel or hermitage.
17. Ditto when a trigonometrical point.
18. Isolated cross.
19. Lighthouse.
20. Ditto when a trigonometrical point.
21. Telegraph station.
22. Ditto when a trigonometrical point.
23. Redoubt.
24. Ditto when a trigonometrical point.
25. Castle or fort.
    (i.) Castle or fort when a trigonometrical point.
26. Windmill.
    (i.) Windmill when a trigonometrical point.
27. Watermill.
28. Limekiln.
29. Working mine.
30. Well or spring.
31. Mineral waters.
32. Baths.
33. Trigonometrical point, 1st class.
34. Ditto 2nd class.
35. Aqueduct.
36. Entrenchments.
37. Stone bridge for vehicles.
38. Wooden ditto
39. Bridle bridge.
40. High road, 1st class.
41. Ditto 2nd class.
42. Municipal or county roads.
43. Local or cross roads.
44. Private road.
45. Railway.
46. Bar.
47. League stone.
48. Posting house.
49. Rocks.
50. Rocks.
51. Sand.
52. Clay.
53. Water.
54. Marsh.
55. Watercourses.
56. Large ditch.
57. Saltworks.
58. Large bushes or deciduous wood.
59. Coniferous wood.
60. State boundary.
61. Province boundary.
62. Administrative district boundary.
63. Municipal boundary.
64. Parish boundary.

65. Shire (Comarca) boundary.
66. Military division boundary.
67. Archbishopric boundary.
68. Bishopric boundary.

Bench marks or altitudes in metres above the sea level are placed on the doorsills of churches, mills, and isolated buildings, on the foot of pedestals, on the roadway of bridges, at the points of junction of roads and rivers or, in their absence, at any convenient spot.

RUSSIA.

Russia has commenced or executed great works in Geodesy, viz., Struve's arc of the meridian from the North Sea to the Danube, and the Russian portion of the great arc of the parallel of 52° north latitude from Valentia to Orsk. Primary triangulations have been executed over a large portion of the western governments of Russia, in Poland, in the country of the Cossacks of the Don, the Caucasus, and in the Valley of the Volga.

Nearly all the maps published in Russia emanate from the Corps of Military Topographers, which was founded in 1796. After the year 1812 the corps was placed under the Ministry for War, and in 1866 it was completly reorganised and became the Topographical Department of the General Staff.

Civil Divisions and Areas.

Russia in Europe is divided thus:—

——	Divisions.	Provinces or Governments.	Area Eng. sq. Miles.
Russia Proper	6	51	1,898,760
Poland	1	10	49,158
Finland	1	8	144,226
Caucausus	2	14	172,835
Total	10	83	2,264,979

Russia in Asia is divided thus:—

——	Divisions.	Provinces or Governments.	Area Eng. sq. Miles.
Siberia	1	9	4,826,287
Central Asia..	1	11	1,344,595
Total	2	20	6,170,882
Total of Empire ..	12	103	8,435,861

The governments or provinces are again sub-divided into districts and circles, called "ouyezds" and "okroogs."

Military Divisions.

The Empire is divided into 14 Military Districts, sub-divided into 81 Governments or provinces, and again into Local Brigade Regions. These are sub-divided into circles (ouyezds).

It is contemplated to re-distribute the empire into Army Corps districts, a scheme which will probably be carried out by the year 1889. At present there are 19 Army Corps distributed amongst the 14 districts.

MEASUREMENTS OF LENGTH.

Degree on the Equator.	Lithuania Mile.	Verst or Russian Mile.	Saschen or Sajene.	Marine Saschen.	Arschine.	Stopa.	Fut.	Vershok.	Duim.	Paletz.	Metric Equivalents.		English Equivalents.		
											Metres.	Kilometres.	Inches.	Yards.	Miles.
1	12·43	104·33	52165	60859	156495	312990	365155	2503920	4382804	8764128	111321	111·321	4382804	121744·6	69·173
	1	8·4	4200	4900	12600	25200	29400	201600	352535	705070	8876·956	8·876956	352535	9792·637	5·564
		1	500	583·$\dot{3}$	1500	3000	3500	24000	42000	84000	1066·78072	1·06678072	42000	1166·$\dot{6}$	·66287878
			1	1·1$\dot{6}$	3	6	7	48	84	168	2·113561	·00211356	84	2·$\dot{3}$	—
				1	2·571428	5·142856	6	41·14285	72	144	1·828854	·00182885	72	2	—
					1	2	2·$\dot{3}$	16	28	56	·70452	·00070452	28	·$\dot{7}$	—
						1	1·1$\dot{6}$	8	14	28	·35226	·00035226	14	·3$\dot{8}$	—
							1	6·857142	12	24	·304794	·000304794	12	·$\dot{3}$	—
								1	1·75	3·5	·04403	·00004403	1·75	·04861	—
									1	2	·0254	·0000254	1	·02775	—
										1	·0127	·0000127	·5	·01387	—

MEASURES OF SURFACE.

Desatine (Common).	Desatine (Crown).	Square Saschen or Sajene.	Square Arschine.	Square Fut.	Square Vershok.	Square Duim.	Metric Equivalents.		English Equivalents.		
							Ares.	Hectares.	Square Inches.	Square Yards.	Acres.
1	1·$\dot{3}$	3200	28800	156800	7372800	22579200	145·66656	1·4566656	22579200	17422·$\dot{2}$	3·6
	1	2400	21600	117600	5529600	16934400	109·25002	1·0925002	16934400	13066·$\dot{6}$	2·7
		1	9	49	2304	7056	·0455208	·000455208	7056	5·$\dot{4}$	·001157407
			1	5·$\dot{4}$	256	784	·0050567	·000050567	784	·6049382716	—
				1	47·020408	144	—	—	144	·$\dot{1}$	—
					1	3·0625	—	—	3·0625	—	—
						1	—	—	1	—	—

NOTE.—The Crown desatine is a rectangle, 80 saschens by 30 saschens.

It is intended to introduce the metrical system in Russia, to be obligatory in 1883.

GOVERNMENT MAPS OF RUSSIA.

Longitude is reckoned from Pulkowa, which is 30° 19′ *E. of Greenwich—except in the following maps, viz.:—*

Poland	$\frac{1}{126000}$,	it is reckoned from	Warsaw, 21 1′ E. of Greenwich.
Russia in Europe	$\frac{1}{126000}$,	" "	Pulkowa and from Paris which is 2° 20′ E. of Greenwich.
Central Asia	$\frac{1}{4200000}$,	" "	Paris.
Orenburg	$\frac{1}{2100000}$,	" "	Ferro Island (Canaries), which is 18° 9′ W. of Greenwich.
Asiatic Turkey	$\frac{1}{840000}$,	" "	Pulkowa and Ferro.
Caucasus	$\frac{1}{210000}$,	" "	Ferro.

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Cadastral survey ..	$\frac{1}{8400}$	..	..	..	Not published.
Poland. (Topographical Military)	$\frac{1}{126000}$ 3 versts.	1875	59	Topo. Dept. of the General Staff.	Copper engraved.
Russia in Europe. (Topographical Military).	$\frac{1}{126000}$	1857 in hand.	480	ditto	To be completed in 792 sheets; shewing railways.
Special map of ditto	$\frac{1}{420000}$ 10 versts	1868 in hand.	131	ditto	In 154 sheets.
Military road map of ditto.	$\frac{1}{1050000}$ 25 versts	1880	16	ditto.	
Map of Central Asia	$\frac{1}{4200000}$ 100 versts.	1880	4	ditto. (Turkestan Section.)	
Orenburg	$\frac{1}{2100000}$ 50 versts	1880	2	ditto.	
Asiatic Russia ..	$\frac{1}{8400000}$ 200 versts.	1880	2	ditto.	
Asiatic Russia and N.W. Mongolia.	$\frac{1}{4200000}$	1880	..	ditto (Turkestan Section.)	N.W. Mongolia is reduced from a map done in 1876-7. Scale $\frac{1}{2100000}$.
Asiatic Turkey ..	$\frac{1}{840000}$	corrected to 1878	11	ditto (Caucasus Section.)	Lithographed for the use of the troops from year to year. Printed in colours — vertical hachures.
Military districts of Turkestan.	$\frac{1}{1680000}$	1877	16	ditto (Turkestan Section.)	Corrected to 1880.
Post map of Russia in Europe.	$\frac{1}{2520000}$	1863	9	ditto.	
Russia in Europe ..	$\frac{1}{1680000}$ 40 versts	in hand.	5	ditto	To be completed in 12 sheets.
Russian Turkestan and neighbouring counties.	$\frac{1}{4200000}$	1878	1	ditto (Turkestan Section.)	Lithographed from year to year for the troops.
West Siberia ..	$\frac{1}{2100000}$ 50 versts	1880	4	ditto.	

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
North Turkestan ..	$\frac{1}{1680000}$	1876	1	Topo. Dept. of the General Staff. (Turkestan Section.)	Lithographed from year to year for the troops.
Caucasus	$\frac{1}{210000}$	..	63	ditto.	In 77 sheets.
Communications, European Russia and Caucasus, Roads, water, telegraphs.	$\frac{1}{3360000}$	1859	4	ditto.	
Railways	$\frac{1}{1680000}$	1874	8	ditto.	

CONVENTIONAL SIGNS ON THE TOPOGRAPHICAL MILITARY MAPS OF RUSSIA. (*See* Plate XV.)

1. Trigonometrical point.
2. Topographical point.
3. Verstpost (stone).
4. Verstpost (wooden).
5. Cross (stone).
6. Cross (wooden).
7. Isolated buildings and houses.
8. Forester's lodge.
9. Woodkeeper's lodge.
10. Inn (stone).
11. Inn (wooden).
12. Toll house.
13. Toll bar.
14. Toll picquet and cordon.
15. Quarantine.
16. Cloister (stone).
17. Church (stone).
18. House of prayer (stone).
19. Mosque (stone).
20. Cloister (wooden).
21. Church (wooden).
22. House of prayer (wooden).
23. Mosque (wooden).
24. Churchyard.
25. Factories and establishments.
26. Water mill (stone).
27. Water mill (wooden).
28. Saw mill.
29. Windmill (stone).
30. Windmill (wooden).
31. Lighthouse (stone).

32. Lighthouse (wooden).
33. Posting station.
34. Telegraph station.
35. Harbour on the sea.
36. Harbour on a river.
37. Railway station, 1st class.
38. Railway station, 2nd class.
39. Railway station, 3rd class.
40. Railway station, 4th class.
41. Turnpike. Bonding warehouse.
42. Ruins.
43. Wells.
44. Mineral water.
45. Direction of current.
46. Hidden rocks.
47. Whirlpool.
48. Ford on foot.
49. Ford for horses.
50. Bridge (stone).
51. Bridge (wooden).
52. Bridge of rafts.
53. Bridge of boats.
54. Ferry.
55. Springs and unnavigable stream.
56. Navigable river.
57. Unnavigable canal.
58. Navigable canal.
59. State frontier.
60. Government and military boundary.
61. Circle (ouyezd) boundary.
62. Railway in course of construction.
63. Railway at work.
64. Chaussée with trees.
65. Ditto.
66. Chaussée without trees.
67. Posting road with trees.
68. Ditto without trees.
69. Roads with drains.
70. Ditto without drains.
71. Small common roads.
72. Footpath.
73. Winter road.
74. Fascine road.
75. Projected road.
76. Line of telegraph.
77. Earth bank.
78. Causeway.
79. Dry wood.
80. Swampy wood.
81. Dry bushes.
82. Swampy bushes.

83. Upland meadow.
84. Ditto.
85. Water meadow.
86. Meadow with bushes.
87. Ditto with hillocks.
88. Morass.
89. Ditto with reeds.
90. Flat sand tracts.
91. Sand tracts with hillocks.
92. Separate group of trees.
93. Woods, cleared.
94. Orchard or fruit garden.
95. Vegetable garden.
96. Vineyard.
97. Rocks.
98. Mountains.
99. Water.
    (i.) Sluice.
    (ii.) Rocks above water.
100. (i.) Sandbank.
    (ii.) Inundation.
    (iii.) Islands.
101. Towns and places generally in plan.

Hill features are shown by means of hachures.

Conventional Signs on the Map of Turkey in Asia, Asia Minor, Armenia, Northern Kurdistan, $\frac{1}{840000}$ corrected to 1878 (in Russia) compiled by the Topographical Department of the Caucasus Military District. (*See* Plate XV.)

1. Vilayet.
2. Sandjak.
3. Kaza.
4. Fortress.
5. Walled town.
6. Village (walled).
7. Staff quarters.
8. Fort.
9. Fortified bridge or post.
10. Cossack village.
11. Monastery.
12. Large village or colony.
13. Ruins and nomad camp (large).
14. Small village.
15. Settlement and nomad camp (small).
16. Stud farm.
17. Frontier post.
18. Custom house.
19. Posting house.

20. Lighthouse.
21. Small harbour.
22. Large harbour.
23. Telegraph office, international.
24. Telegraph office, interior.
25. Caravansarais.
26. Railway.
27. Post and cavaran road.
28. Country road and bridle path.
29. Stream.
30. River.
31. Lake, salt marsh, cape, island and gulf.
32. Mountain range.
33. Isolated hill.

SPAIN.

The survey of Spain is in the hands of the Geographical and Statistical Institute at Madrid, under the Minister of [*]"Fomento," and is on a scale of $\frac{1}{50000}$. The field surveys are executed on a scale of $\frac{1}{25000}$, and are reduced for publication. Each sheet of the $\frac{1}{50000}$ map will contain 20 minutes of longitude and 10 minutes of latitude. The few sheets that are already published are engraved on stone and printed in colours: water, blue; main roads, localities and isolated houses, red; other roads, railways, boundaries of cultivation, writing, black; gardens, orchards, forests, green; contours, 20 m. apart, brown.

The Depôt de la Guerre has published many maps of the Theatre of the Carlist War, showing works executed and the positions of troops.

Civil Divisions.

For administrative purposes, Spain is divided into 49 provinces, including the two provinces of the Balearic Islands and the Canaries. The provinces are divided into districts (pardido judicial).

Military Divisions.

For military purposes Spain is divided into 14 Military Districts (capitanías generales) of which the Balearic Islands and the Canaries each form one. These districts are subdivided into 49 provinces (general commands) which are identical with the civil divisions. There is a further subdivision into recruiting districts.

Area.

Spain proper	191,106 sq. miles.
Canaries and Balearic Islands ..	4,468 „
	195,774 sq. miles.

Measures of Length and Surface.

The measures of length and surface in Spain are precisely the same as those of France; the "metrico decimal" system having been adopted by a law passed in 1848. (*See* France, page 42.)

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[*] Minister of the Interior.

COMPARISON BETWEEN THE OLD AND NEW MEASURES OF LENGTH.

Old Measure.																	New Measure.		English Equivalents.		
	Legua.																				
Degree on Equator.	Spanish, Since 1766.	Geographical Philip V.)	Marine.	Castille or Legal.	Milla (Marine).	Cuerda.	Estadal.	Braga or Estado.	Vara.	Pie de Burgos.	Palmo Mayor.	Sesma.	Pulgada.	Dedo.	Linea.	Punto.	Metros.	Kilómetros.	Inches.	Yards.	Miles.
1	16·4078	17·5	20	26·2524	60	15910·56	32815·6	65631·2	131262·4	393787·2	—	—	—	—	—	—	111321	111·321	4382804	121744·6	69·173
	1	1·06	1·2189	1·6	3·6567	969·696	2000	4000	8000	24000	—	—	—	—	—	—	6783·5062	6·7835062	267072	7418·6̇	4·2151515
		1	1·14285	1·5	3·43015	909·0909	1875	3750	7500	22500	—	—	—	—	—	—	6360·11	6·36011	250403·65	6955·65714	3·95207
			1	1·31262	3	795·528	1640·78	3281·56	6563·12	19689·36	—	—	—	—	—	—	5565·1	5·5651	219103·2	6086·2	3·458
				1	2·28676	606·0606	1250	2500	5000	15000	—	—	—	—	—	—	4239·6	4·2396	166920	4636·6̇	2·63447
					1	265·176	546·926	1093·853	2187·706	6536·118	—	—	—	—	—	—	1855·03	1·85503	73034·4	2318·55238	1·1529
						1	2·0625	4·125	8·25	24·75	33	49·5	297	396	3564	42768	6·9905	·0069905	275·418	7·6505	·0043412
							1	2	4	12	16	24	144	192	1728	20736	3·39168	·00339168	133·536	3·7093	·0021076
								1	2	6	8	12	72	96	864	10368	1·69584	·00169584	66·768	1·8546	·0010538
									1	3	4	6	36	48	432	5184	·84792	·00084792	33·384	·9273	·0005269
										1	1·3̇	2	12	16	144	1728	·28264	·00028264	11·128	·3091	—
											1	1·5	9	12	108	1296	·21198	·00021198	8·346	·2318	—
												1	6	8	72	864	·14132	·00014132	5·564	·1545	—
													1	1·3̇	12	144	·02355	·00002355	·927	—	—
														1	9	108	·01766	·00001766	·6955	—	—
															1	12	·00196	·00000196	·077	—	—
																1	·00016	·00000016	·0064	—	—

NOTE.—A Spanish nautical mile = an English geographical mile.

COMPARISON BETWEEN THE OLD AND NEW MEASURES OF SURFACE.

Old Measure.						New Measure.		English Equivalents.		
Yugada (legal), since 1801.	Fanegada.	Square Estadal.	Square Braça.	Square Vara.	Square Pie de Burgos.	Area.	Hectares.	Square Inches.	Square Yards.	Acres.
1	50	28800	115200	460800	4147200	3313·0875	33·130875	513557663	396256·32	81·871
	1	576	2304	9216	82944	66·26175	·6626175	10271153·258	7925·1264	1·63742
		1	4	16	144	·115037	·00115037	17831·863296	13·7589	·0028427
			1	4	36	·028759	·00028759	4457·9658	3·439788	·0007107
				1	9	·007189	·00007189	1114·4914	·859947	·0001777
					1	·0007988	·000007988	123·83238	·095549	·0000197

GOVERNMENT MAPS OF SPAIN.

(*Longitude is reckoned from Madrid, which is* 3° 41′ *W. of Greenwich.*)

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Topographical map of Spain.	$\frac{1}{50000}$	1875 in hand.	14 (1881)	Geographical and Statistical Institution at Madrid.	Stone engraved. To be completed in 1080 sheets, printed in 5 colours. Ground represented by contours 20 m. apart.
Military and road map of Spain.	$\frac{1}{500000}$	1865	20	ditto	Printed in colours, without hills, and accompanied by 8 books of itineraries.
Atlas of Spain ..	$\frac{1}{100000}$ and $\frac{1}{200000}$	—	—	ditto	Chromo-lithographed.

CONVENTIONAL SIGNS USED IN THE TOPOGRAPHICAL MAP OF SPAIN. $\frac{1}{50000}$. (*See* Plate XVI.)

1. Watering place for cattle—*col. blue.*
2. Canal—*col. blue.*
3. Aqueduct—*col. red.*
4. Mineral waters.
5. Altitude in meters (referred to mean level of Mediterranean at Alicante).
6. Fruit-bearing trees—*col. green.*
7. Reservoir—*col. blue.*
8. Sandy ground or beach.

9. Dockyard for ships of war.
10. Dockyard for merchantmen.
11. Watercourse, permanent stream—*col. blue.*
12. Watercourse, sometimes dry—*col. blue.*
13. Rice fields.
14. Watch tower (Atalaya)
15. Baths.
16. Boat with rope (ferry)—*col. water blue.*
17. Boat with oars, for passengers.
18. Boat with oars, for vehicles.
19. Turnpike, barrier—*col. red.*
20. Road for carriages and wagons.
21. Narrow road, bridle road.
22. Local road.
23. Road in a cutting.
24. Road on embankment.
25. Navigable canal, banks built up of masonry &c.—*col. red.*
26. Ditto natural banks of earth.
27. Ditto in construction.
28. Irrigation canal (as in No. 25)—*col. red.*
29. Ditto (as in No. 26)
30. Ditto in construction.
31. Subterranean canal—*col. red.*
32. Disused canal.
33. Quarries.
34. Glen or dale between mountains (cattle track from one district to another).
35. Sugar cane plantation.
36. Plantation of canes or reeds.
37. Water pipe.
38. High road 1st class—*col. red.*
39. Ditto 2nd class—*col. red.*
40. Ditto 3rd class—*col. red.*
41. Ditto 1st class in construction—*col. red.*
42. Ditto 2nd ditto *col. red.*
43. Ditto 3rd ditto *col. red.*
44. Castle—*col. red.*
45. Cemetery—*col. red.*
46. Wooden fence.
47. Convent—*col. red.*
48. Farm house, school, grange, country house—*col. red.*
49. Coast—*col. blue.*
50. Cross.
51. Contour—*col. brown,* and altitude—*col. black,* in metres.
52. Reservoir, pond, dam of water—*col. red, water blue.*
53. Dam with retaining wall—*col., water blue,* wall—*col. red.*
54. Dam, earth embankment.
55. Direction of current.
56. Sand hills.
57. Uncultivated ground.
58. Pasture land—*green patches.*

59. Hermitage, sanctuary.
60. Steep rugged ground (rocks).
61. Steep ground (earth).
62. Locks—*col. red.*
63. Palisading on embankment.
64. Railway station—*col. red.*
65. Manufactory worked by animal power—*col. red square.*
66. Manufactory worked by water power—*col. red, water blue.*
67. Manufactory worked by steam power—*col. red square.*
68. Lighthouse, 1st class—*col. red.*
69. Lighthouse, 2nd class—*col. red.*
70. Lighthouse, 3rd class—*col. red.*
71. Lighthouse, inferior, harbour light—*col. red.*
72. Lighthouse, with fixed light—*col. blue.*
73. Lighthouse, with flashing light—*col. blue.*
74. Lighthouse, with intermittent light, one minute interval —*col. blue.*
75. Lighthouse, with intermittent light, half-minute interval —*col. blue.*
76. Railway.
77. Railway in construction.
78. Anchorage for men of war.
79. Anchorage for ships of small tonnage.
80. Ditch, with water—*col. water blue.*
81. Dry ditch.
82. Frontier.
83. Fountain, spring—*col. red.*
84. Fort—*col. red.*
85. Lime kiln—*col. red.*
86. Kitchen gardens—*col. green.*
87. Church—*col. red.*
88. Statue, image—*col. red.*
89. Gardens—*col. green.*
90. Permanent lake—*col. blue.*
91. Lake, sometimes dry—*col. blue.*
92. Boundary of ecclesiastical district.
93. Boundary of municipal district.
94. Boundary of province.
95. Telegraph.
96. 'Mareógrafo'—*col. red.*
97. Mine, working.
98. Mill—*col. red.*
99. Forest—*col. green.*
100. Copse, wood—*col. green.*
101. Wall of brick, stone, or mud—*col. red.*
102. Orange or lemon grove.
103. Draw-well—*col. blue.*
104. Obelisk—*col. red.*
105. Observatory—*col. red.*
106. Olive grove—*col. green.*
107. Marsh—*col. blue.*

108. Town—*col. red.*
109. Ferry bridge—*col. water blue.*
110. Pontoon bridge.
111. Toll bar.
112. Kilometre stone.
113. Well—*col. red.*
114. Meadow land—*col. green.*
115. Weir, masonry—*col. red, water blue.*
116. Weir, wood—*col. water blue.*
117. Bridge, masonry—*col. red.*
118. Bridge, iron.
119. Bridge, masonry and iron—*col. masonry red.*
120. Bridge, wood.
121. Bridge, suspension.
122. Bridge, flying—*col. water blue.*
123. Bridge of boats.
124. Draw bridge.
125. Altitude of a spot between two contours—*col. point red.*
126. River—*col. blue.*
127. Ruins—*col. red.*
128. Salt pits.
129. Cataract, water fall—*water blue.*
130. Footpath.
131. Arable land.
132. Watch tower (Coast)—*col. red.*
133. Telegraph tower—*col. red.*
134. Watch tower—*col. red.*
135. Tramway.
136. Tunnel.
137. Ford for vehicles—*col. water blue.*
138. Ford, foot and horse—*col. water blue.*
139. Trig. station, 1st order.
140. Trig. station, 2nd order.
141. Trig. station, 3rd order.
142. Trig. point on a building.
143. Nullah—Donga—Wady.
144. Vineyard.
145. Vineyard and olive grove—*col. olives green.*
146. Volcano, extinct.
147. Character and size of writing for town of over 200,000 inhabitants.
148. Ditto ditto 100,000 inhabitants.
149. Ditto ditto, capital of province.
150. Ditto ditto, not the capital of province, but more than 8,000 inhabitants.
151. Ditto ditto, of less than 8,000 inhabitants, and principal place of municipal district.

CONVENTIONAL SIGNS USED IN THE MILITARY MAP OF SPAIN.
(*See* Plate XVI.)

1. City—*col. red.*
2. Town—*red outline.*
3. Village—*red outline.*
4. Hamlet—*red outline.*
5. Isolated house—*col. red.*
6. Places out of Spain—*red outline.*
7. Open town—*red outline.*
8. Enclosed or walled town—*red outline.*
9. Fortified town—*red outline.*
10. Castle or fort—*col. red.*
11. Capital of military district—*red outline.*
12. Capital of military sub-district—*red outline.*
13. Halting place (supplies)—*col. red.*
14. Telegraph station—*col. red.*
15. Railway and station—*col. black.*
16. Railway in construction—*col. black.*
17. Highways—*col. red.*
18. Highways in construction—*col. red.*
19. Road for carriages and wagons—*red outline.*
20. Bridle path—*red outline.*
21. Foot path—*col. red.*
22. Cattle track—*col. red.*
23. Roads not reconnoitred—*col. red.*
24. Cross roads—*col. red.*
25. Railways out of Spain—*col. black.*
    (i.) High road out of Spain—*col. red.*
    (ii.) Country road or bridle path out of Spain—*red outline.*
26. Sea and coast and sand—*water blue.*
27. Large river—*col. blue.*
28. River—*col. blue.*
29. Brook—*col. blue.*
30. Navigable canal—*col. blue.*
31. Irrigation canal—*col. blue.*
32. Ports—*col. blue.*
33. Anchorage—*col. blue.*
34. Lighthouse—*col. red.*
35. Ordinary sea communication—*col. red.*
    (i.) Steam sea communication—*col. red.*
36. Boundary of kingdom—*col. black.*
37. Boundary of grand military district—*col. black.*
38. Boundary of grand military sub-district—*col. black.*
39. Boundary of civil provinces—*col. black.*
40. Boundary out of Spain—*col. black.*
41. Olive groves or woodland—*col. black.*
42. Vineyards—*col. black.*
43. Copse or bushes—*col. black.*
44. Forest—*col. black.*

45. Orchards or kitchen gardens—*col. black.*
46. Pleasure gardens—*col. black.*
47. Salt pans—*water blue.*
48. Rice fields—*col. black.*
49. Boggy land—*water blue.*
50. Lake—*col. blue.*
51. Mounds (rugged ground)—*col. black.*
52. Rocks—*col. sienna.*
53. Bridge, (stone).
54. Bridge, (wood).
55. Bridge, suspension.
56. Bridge, floating.
57. Bridge, pontoon.
58. Bridge, culvert.
59. Ford for vehicles.
60. Ford for animals.
61. Ford for foot passengers.
62. Ruined buildings.
63. Ditto (subterranean).
64. Walls of stone or earth.
65. Fields with stone or bush fences.
66. Limits of cultivation.

Characters for Names of Towns, &c.

Population 1–9 inhabitants, cursive letters—*col. black.*
Ditto 10–99 inhabitants, cursive letters with initial figure of No.—*col. black.*
Population 100–999 inhabitants, roman small characters—*col. black.*
Population 1000–9999 inhabitants, roman capitals—*col. black.*
Ditto 10000 and over inhabitants, block letters—*col. black.*
Ranges of mountains, cursive back-hand—*in red.*

Abbreviations.

A.	Brook.
Abr͠o.	Watering place for cattle.
Ac.	Canal, trench or drain.
Bc͠a.	Ferry.
C.	Road.
Cãs.	Village.
Cort.	Farm house.
C. P.	Posting house, stage house.
E.	Tavern.
E. T.	Telegraph station.
Fc͠a.	Manufactory.

Fte.	Spring.
Gr.	Country house.
Hda.	An estate.
h.	Hour.
K. k.	Kilometre.
L. l.	Spanish league.
M°.	Mill.
N.	North.
P.	Bridge.
Pgo.	Turnpike-toll.
P. C.	Footpath.
R.	River.
V.	Ford.
Vta.	Inn.
Vllo.	A small inn.

SWEDEN.

Since 1874 surveys have been executed by the Topographical Division of the General Staff.

In 1873 the "Economy map" Establishment was absorbed in this Division of the General Staff.

Civil Divisions.

Sweden is divided into 3 regions, viz., Svea-land, Gothland, and Norr-land.

The kingdom is also divided into 24 "Läns" (counties) each presided over by a Governor, the Läns are subdivided into 117 Fögder or districts, each comprising one or more "Harads" or cantons, of which there are 264. The "Harads" are again subdivided into "Socken" (parishes).

A "Hemman" is a part of a "Socken" and is of 3 descriptions, viz., "Frälse" (tax free) "Krona" (crown), and "Skatte" (tax paying) "Hemman".

Military Divisions.

For administrative purposes the kingdom is divided into 6 military divisional districts, sub-divided into 49 battalion conscription districts, each of which again into 4 company districts.

Area.

Land	157,251	
Lakes	14,721	
Total ..	171,972	square miles.

Measures of Length and Surface.

The French Metric system is to be exclusively used from 1st January 1889. It was introduced in 1875, the old system being used concurrently with it until 1889. (*See* France, page 42.)

Comparison of Old and New Measures of Length.

Old Measure.											New Measure.		English Equivalents.		
Mil, Decimal and Duodecimal System.	Ref, Decimal System.	Stäng, Duodecimal System.	Stäng, Decimal System.	Famn, Duodecimal System.	Aln, Duodecimal System.	Fot, Decimal and Duodecimal System.	Tum, Decimal System.	Tum, Duodecimal System.	Linier, Decimal System.	Linier, Duodecimal System.	Mètres.	Kilomètres.	Inches.	Yards.	Miles.
1	360	2250	3600	6000	18000	36000	360000	432000	3600000	5184000	10688·436	10·688436	420815	11689·3	6·641647
	1	6·25	10	16·6̇	50	100	1000	1200	10000	14400	29·6901	·0296901	1168·93	32·47	—
		1	1·6	2·6̇	8	16	160	192	1600	2304	4·750416	·00475041	187·0288	5·1952	—
			1	1·6̇	5	10	100	120	1000	1440	2·96901	·00296901	116·893	3·247	—
				1	3	6	60	72	600	864	1·781406	·001781406	70·1358	1·9482	—
					1	2	20	24	200	288	·593802	·000593802	23·3786	·6494	—
						1	10	12	100	144	·296901	—	11·6893	·3247	—
							1	1·2	10	14·4	·0296901	—	1·16893	·03247	—
								1	8·3̇	12	·024742	—	·9741	·02706	—
									1	1·44	·00296901	—	·116893	·003247	—
										1	·002062	—	·0812	·002255	—

Note.—The duodecimal old system was in use up to 1863, the decimal old system has been in use subsequently.

COMPARISONS OF OLD AND

Old Measure.											
Quadrat mil, decimal and duodecimal system.	Tunnland, duodecimal system.	Spannland, duodecimal system.	Quadrat ref, decimal system.	Fjerding, duodecimal system.	Kappland, duodecimal system.	Kannland, duodecimal system.	Quadrat stäng, duodecimal system.	Quadrat stäng, decimal system.	Quadrat aln, duodecimal system.	Quadrat fot, decimal and duodecimal systems.	Quodrat tum, decimal system.
1	23142·857	46285·71	129600	185142·85	740571·4	1296000	5062500	12960000	324000000	1296000000	129600000000
	1	2	5·6	8	32	56	218·75	560	14000	56000	5600000
		1	2·8	4	16	28	109·375	280	7000	28000	2800000
			1	1·42857	5·712284	10	39·0625	100	2500	10000	1000000
				1	4	7	27·344	70	1750	7000	700000
					1	1·75	6·836	17·5	437·5	1750	175000
						1	3·906	10	250	1000	100000
							1	2·56	64	256	25600
								1	25	100	10000
									1	4	400
										1	100
											1

NOTE.—The "duodecimal old system" was in use up to 1863; the decimal old system has been in use subsequently.

NEW MEASURES OF SURFACE.

			New Measure.		English Equivalents.			
Quadrat tum, duodecimal system.	Quadrat linier, decimal system.	Quadrat linier, duodecimal system.	Ares.	Hectares.	Square inches.	Square yards.	Acres.	Square miles.
18622400000000	12960000000000	—	1142426·64	11424·2664	177085264225	136639864·3	28231·38	44·11147487
—	—	—	49·364112	·49364112	7651694·21	5904·08504	1·21985	—
—	—	—	24·682056	·24682056	3825847·1	2952·042	·60992	—
1440000	100000000	207360000	8·81502	·0881502	1367397·3	1054·3	·21783	—
—	—	—	6·170514	·06170514	956461·8	738·01	·15248	—
—	—	—	1·5426285	·015426285	239115·4	184·5	·03812	—
—	—	—	·881502	·00881502	136739·73	105·43	—	—
36868	2560000	5306216	·2256645	·002256645	35009·36	26·99	—	—
14400	1000000	2073600	·0881502	·000881502	13679·978	10·546	—	—
576	40000	82944	·003526008	·00003526008	546·9588	·42172	—	—
144	10000	20736	·000881502	·00000881502	136·73973449	·10543009	—	—
1·44	100	207·36	·00000881502	—	1·3673973	—	—	—
1	69·4439	144	·000006121	—	·949	—	—	—
	1	2·0736	·0000000881502	—	·013673973	—	—	—
		1	·0000000425	—	·00659	—	—	—

GOVERNMENT MAPS OF SWEDEN.

(*Longitude is reckoned from Stockholm, which is* 18° 3′ *E. of Greenwich, except in the case of the Län maps, in which it is reckoned from Stockholm and from Ferro* 18° 9′ *W. of Greenwich.*)

Name of Map.	Scale.	Date.	No. of sheets published.	By whom published.	Remarks.
Topographical map of Sweden. (Southern portion.)	$\frac{1}{100000}$	1857 In hand.	64 (1881)	Topographical Department, Stockholm.	Copper engraved. To be completed in 102 sheets; for important and populous districts the scale is $\frac{1}{50000}$.
Län map	$\frac{1}{200000}$	1842 In hand.	28	Ditto	Copper engraved. Each Län has a special map.
General map ..	$\frac{1}{1000000}$	1865 to 1876	3	Ditto	In 3 sheets.
Stockholm	$\frac{1}{20000}$	1861	9	Ditto	
Passes and Positions	$\frac{1}{20000}$ $\frac{1}{10000}$	..	..	Ditto	

CONVENTIONAL SIGNS ON THE TOPOGRAPHICAL MAP OF SWEDEN $\frac{1}{100000}$. (*See* Plate XVII.)

1. Frontier of kingdom—*col. brown.*
2. Boundary of county (Län)—*col. green.*
3. Boundary of Canton (Harad)—*col. yellow.*
4. Boundary of parish (Socken)—*col. red.*
5. Railway on newer sheets.
6. Railway on older sheets.
7. Chaussée or high road.
8 Country roads, canton roads, superior parish roads.
9. Good parish and manor roads, superior bye roads (on newer sheets).
10. Bad parish and manor roads and bye roads (on older sheets).
11. Bad parish and bye-roads (on newer sheets).
12. Winter roads.
13. Bridle or footpath.
14. Bridge over railway.
15. Culvert bridge under railway.
16. Level railway crossing.
17. Tunnel.
18. Embankment.
19. Cutting.
20. Railway station.
21. Guard house on railway.
22. Viaduct.

23. Stone bridge.
24. Wooden bridge.
25. Foot bridge.
26. Flying bridge.
27. Rowing ferry.
28. Hawling ferry.
29. Canal.
30. Lock.
31. Waterfall.
32. Rapid.
33. Ford.
34. Current arrow.
35. Head of navigability of a river.
36. Bank above water.
    (i.) Bank under water.
37. Rock at surface of the water.
    (i.) Rock, sunken.
38. Site where stones have been sunk.
39. Site of a wreck.
40. Lighthouse.
41. Land beacon.
42. Sea beacon.
43. Loading place.
44. Harbour.
45. Anchorage.
46. Fair way for vessels.
47. Fair way for boats.
48. Ship building yard.
49. Church (stone).
50. Church (wooden).
51. Castle.
52. Manor house (large).
53. Manor house (small).
54. Parsonage.
55. Hamlet or group of houses (on older sheets).
56. Hamlet or group of houses (on newer sheets).
57. Isolated house (on older sheets).
58. Isolated house (on newer sheets).
59. Cottage.
60. Posting house.
61. Inn.
62. Court house.
63. Parish store.
64. Market place.
65. Milestone.
66. Optical telegraph.
67. Electric telegraph.
68. Triangulation point.
69. Silver mine.
70. Copper mine.
71. Iron mine.

72. Smelting work.
73. Forges.
74. Forge factory.
75. Water mill.
76. Wind mill.
77. Saw mill.
78. Hedges.

Altitudes in Norwegian "Fod" (12·3563 English inches, or 3138 metres).

Abbreviations.

St.	Great, principal.
L.	Little.
N.	North.
S.	South.
Ö.	East.
W.	West.
Öf.	Upper.
Ned.	Lower.
Yt.	Outer.
F^{a}.	Ferry.
tj.	Lake.
bg.	Mountain.
sj.	Sea.

SWITZERLAND.

The survey of Switzerland is under the immediate charge of the Chief of the Staff of the Swiss Army at the General Staff Office at Berne.

Civil Divisions.

Switzerland is divided into 22 Cantons, 3 of them being sub-divided into half cantons. The cantons are divided into communes.

Military Divisions.

Switzerland is divided into 8 territorial military divisions, which are sub-divided into 32 regimental districts, and these again into battalion districts, of which there are 96. There is another division into recruiting circles which correspond sometimes with regimental districts and sometimes with from 1 to 3 battalion districts. There are 75 recruiting circles.

Area.

Area 15,991 square miles.

Measures of Length and Surface.

Switzerland adopted the French Metric system of measures on the 1st January 1873, and since 1st January 1877 it has been in full legal force. (*See* France, page 42.)

COMPARISON OF OLD AND NEW MEASURES OF LENGTH.

Old Measure.									New Measure.		English Equivalents.		
Meile.	Stunde.	Ruthe.	Klafter.	Staab.	Ell or Brache or ½ Staab.	Fuss.	Zoll.	Linier.	Metre.	Kilometre.	Inches.	Yards.	Miles.
1	—	—	—	—	—	—	—	—	7816·285	7·816285	—	8548·1479	4·8568
	1	1600	2666·6	4000	8000	16000	160000	1600000	4800	4·8	188979·794	5249·4384	2·9826
		1	1·6	2·5	5	10	100	1000	3	·003	118·11237	3·28089	—
			1	1·5	3	6	60	600	1·8	·0018	70·86742	1·96853	—
				1	2	4	40	400	1·2	·0012	47·24494	1·31235	—
					1	2	20	200	·6	·006	23·62247	·6561798	—
						1	10	100	·3	·003	11·811237	·32809	—
							1	10	·03	·00003	1·1811237	·032809	—
								1	·003	·000003	·11811237	·0032809	—

NOTE.—The ordinary Swiss mile is no longer commensurable with any Swiss "fuss." It appears originally to have been 26666⅔ old Berne fuss of 11·54 English inches.

COMPARISON OF OLD AND NEW MEASURES OF SURFACE.

Old Measure.					New Measure.		English Equivalents.			
Square Stunde.	Juchart.	Square Ruthe.	Square Klafter.	Square Fuss.	Square Meter or Centiar.	Ar.	Square Inches.	Square Yards.	Acres.	Square Miles.
1	6400	2560000	—	—	—	230400	—	—	5693·51	8·896
	1	400	1111·$\dot{1}$	40000	3600	36	5580212·776	4305·71929	·889611	—
		1	2·$\dot{7}$	100	9	·09	13950·53194	10·764298	—	—
			1	36	3·24	·0324	5022·191498	3·875147	—	—
				1	·09	·0009	139·50531947	·107642982	—	—

GOVERNMENT MAPS OF SWITZERLAND.

Longitude is reckoned from Paris, 2° 20′ East of Greenwich.

Name of Map.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Topographical map of Switzerland. (Topographical Atlas.)	$\frac{1}{25000}$ $\frac{1}{50000}$	1870 in hand.	232 (1881)	Topographical Department at Berne.	Chromo-lithographed in 3 colours. Cultivated lands bister; water, blue; rest black. To be completed in 546 sheets. The scale $\frac{1}{50000}$ (115 sheets), is employed for country near the Alps; printed on stone, contours 30 m. (98·427 feet) apart. Elsewhere the scale $\frac{1}{25000}$ (431 sheets), is employed, engraved on copper; contours 10 m. (32·809 feet) apart, and in exceptional cases 8 m. (26·247 feet), and 4 m. (13·124 feet) apart; every 10th contour is broken, with the altitude written above it.
Map of Switzerland. (Topographical Atlas)	$\frac{1}{100000}$	1842 to 1865	25	do.	Copper engraved. In 25 sheets. Heights in meters.
General map of Switzerland.	$\frac{1}{250000}$	1866 to 1874	4	do.	In four sheets.
Railway map ..	$\frac{1}{250000}$	1880	4	do.	do.
General map of Switzerland.	$\frac{1}{500000}$	..	..	do.	Stone engraved in colours.
"Ubersichtskarte" of Switzerland.	$\frac{1}{1000000}$	..	..	do.	do.

CONVENTIONAL SIGNS FOR THE NEW TOPOGRAPHICAL ATLAS OF SWITZERLAND. $\frac{1}{25000}$, $\frac{1}{50000}$. (*See* Plate XVII.)

1. Trigonometrical point.
2. Bench mark.
3. Altitude.
4. Church.
5. Chapel.
6. House.
7. House with drive.
8. Ruin.
9. Avenue.
10. Railway.
    - (i.) Railway station.
11. Macadamised road, broadest.
12. Ditto narrower.
13. Country road without foundation.
14. Mule or bridle path.
15. Footpath.
16. Embankment and cutting.
17. Frontier of country, boundary stones.
18. Canton boundary.
19. District boundary.
20. Commune boundary.
21. Wood.
22. Willows.
23. Vineyard.
24. Garden.
25. Sand.
26. Landslip.
27. Rocks.

THE REPUBLIC OF THE UNITED STATES.

The Survey of the United States is arranged in the following manner, viz.:—

1. The geographical and geological surveys west of the 100th meridian is performed by the Corps of Engineers under the authority of the War Department.

The exploration of the far west beyond the 100th degree of longitude (1,443,360 square miles) is divided into 3 or 4 surveys, viz.:—

"The geological and geographical survey of the territories," charged with the portion north of the 40th degree of latitude.

"The geological exploration of the 40th parallel" (86,390 square miles).

"The rocky mountain portion south of the 40th parallel."

2. The geographical and geological surveys under the Department of the Interior.

Each state executes its own topographical survey, a system productive of confusion of methods, uncertainty of results, and a duplication of surveys.

3. "The land surveys under the Land Office" for land parcelling, viz., the sub-division and sale of the public lands.

Civil Divisions.

The Republic is divided as follows:—

38 States.
1 Federal District (Columbia).
8 Organized Territories.
The Indian Territory.
The Territory of Alaska (purchased from Russia in 1867).

Area.

Its area, including Alaska, is 3,578,174 square miles.

Measures of Length and Surface.

The measures of the United States are precisely the same as those of Great Britain, the metric system (see France, page 42) has however been authorised as permissive by the Act passed 28th July, 1866.

GOVERNMENT MAPS OF THE UNITED STATES.

(Longitude is reckoned from Greenwich, and in some of the earlier maps from Washington, 76° 58′ W. of Greenwich.)

Name of map.	Scale.	Date.	Sheets published.	By whom published.	Remarks.
Survey of the Northern and North-Western Lakes.	$\frac{1}{500}$ to $\frac{1}{400000}$	In progress.	..	War Department.	
Yellowstone River, from Fort Keogh to Fort Buford.	$\frac{1}{9600}$	1879	33	Ditto	Photo-litho.
Topographical and Geological Survey of the United States west of the 100th Meridian. (Topogr. Atlas.)	$\frac{1}{126720}$ and $\frac{1}{253440}$	In progress.	..	Ditto	
Ohio River	$\frac{1}{190080}$	1881	41	Ditto	
Lake Tahoe region, Sierra Nevada, California and Nevada	$\frac{1}{84480}$	1882	..	Ditto	
United States west of the Mississippi.	$\frac{1}{500000}$	1879	..	Ditto	
Colorado	$\frac{1}{1500000}$	1880	..	Ditto	Photo-litho.
Oregon, Washington, and Idaho.	$\frac{1}{1500000}$	1880	..	Ditto	Ditto.
New Mexico and Arizona ..	$\frac{1}{1500000}$	1880	..	Ditto	Ditto.
California and Nevada	$\frac{1}{1500000}$	1880	..	Ditto	Ditto.
Topographical atlas of the territories west of the 100th Meridian.	$\frac{1}{506880}$	In progress.	..	Ditto	To be completed in 95 sheets.
Nebraska	$\frac{1}{625000}$	1881	..	Ditto	Photo-litho.
New Mexico, Coo-chi to the Wahsatch Mountains.	$\frac{1}{760320}$	1855	1	Ditto	
New Mexico, country between Columbus and Fort Craig.	$\frac{1}{760320}$	1855	1	Ditto	
Map of the Yellowstone National Park, Big Horn Mountains, and adjacent Territory.	$\frac{1}{760320}$	1881	..	Ditto	Photo-litho.
California, S. Francisco Bay to the Plains of Los Angeles.	$\frac{1}{760320}$	1855	1	Ditto	
Map of the Department of the Columbia.	$\frac{1}{1013760}$	1881	..	Ditto	Photo-litho.
Outline Map of United States west of the Mississippi.	$\frac{1}{2000000}$	In hand.	..	Ditto	
Map of the Territory of the United States west of the Mississippi.	$\frac{1}{2000000}$	1879	6	Ditto	Ditto.
United States from the Mississippi to the Pacific Ocean.	$\frac{1}{3000000}$	1865 1868	4	Ditto	
United States Territory from the Mississippi River to the Pacific Ocean, with the Territory of Alaska.	$\frac{1}{3000000}$ $\frac{1}{9000000}$	1868	6	Ditto	
Mexico	$\frac{1}{3000000}$	1873	..	Ditto	Photo

Name of Map.	Scale.	Date.	Sheets published.	By whom published.	Remarks.
United States, showing the locations of works and surveys for river and harbour improvement.	$\frac{1}{33264000}$	1879	..	War Department.	Photo-litho.
Mississippi River, Illinois and Ohio.	..	..	9	Ditto	Ditto.
Ditto, from Falls of St. Anthony to Illinois.	..	..	26	Ditto	Ditto.
North Carolina and Tennessee, mountain region.	$\frac{1}{633600}$	1863	1	Interior Department.	
Virginia	„	1862	1	Ditto	
Virginia	„	1863	1	Ditto	
Ditto, Eastern part	$\frac{1}{887040}$	1862	1	Ditto	
Ditto, N.E. part and neighbourhood of Washington.	$\frac{1}{31680}$	1862	1	Ditto	

MARINE SURVEYS.

Foreign nations have, or are, gradually adopting the English Conventional Signs.

The following information is given concerning countries not alluded to herein in further detail. Sweden and Denmark adopt the meridian of Greenwich.

Portugal adopts the meridian of the Marine Observatory (Lisbon Castle) assumed to be in longitude 9° 6′ 15″ west of Greenwich.

Soundings on foreign charts are expressed thus:—

Danish fathom (Favn) = 6·175 English feet = 1·029 English fathom.

Portuguese fathom (Braça) = 7·218 English feet = 1·203 English fathom.

Swedish fathom (Famn) = 5·844 English feet = 0·974 English fathom.

The French Mètre, the Dutch "Elle" and the Spanish, Portuguese, and Italian "Metro" are identical.

GREAT BRITAIN AND IRELAND.

General Remarks.

The Admiralty charts, which number over 2,600, may be classed under 5 heads, viz., ocean, general, and coast charts; harbour plans and physical charts.

All charts and plans are, where practicable, constructed upon the true meridian, *i. e.* the east and west marginal lines are drawn parallel to the true meridian.

Soundings are reduced to mean low water of ordinary spring tides, and are expressed in fathoms (6 feet) and fractions of a fathom, or in feet and fractions of a foot, such being denoted on the chart.

The underlined figures on the dry banks represent, in feet or fathoms, the depth over them at high water, or the height of the banks above low water. The method adopted is explained in the Title of the chart.

The velocity of tide is expressed in knots and fraction of a knot, the period of the tide being shown thus: 1st Qr., 2nd Qr., 3rd Qr., 4th Qr., for 1st, 2nd, 3rd, and 4th Quarters.

The rise of tide is measured from the mean low water level of ordinary springs. The range of tide is measured from the low water of one tide to the high water of the following tide.

All heights are given in feet above high water ordinary springs, and in places where there is no tide above the level of the sea.

All bearings, including the direction of winds and currents, are magnetic, except when otherwise expressed. Bearings of lights are given as seen from seaward and not from the lights.

The natural scale, or the proportion which the chart bears to the earth (obtained by reducing the number of feet in the minute of latitude to inches and dividing the product by the number of inches to a mile of the scale on chart), is represented thus: $\frac{1}{12150}$. E. G. Let the number of feet in the minute of latitude (nautical mile) = 6075′ or 72900″ and the scale = 6″ to a sea mile, then the natural scale = $\frac{1}{\frac{72900}{6}}$ or $\frac{1}{12150}$.

The geographical mile is generally defined to be the length of a minute of arc of the earth's equator; but the nautical or sea mile as defined by hydrographers is the length of a minute of the meridian, and is different for every latitude. It is equal to a minute of arc of a circle, whose radius is the radius of the curvature of the meridian, at the latitude of the place.

Length of one degree of latitude or 60 sea miles at latitude 0° = 68·704 statute miles.
Length of one degree of latitude or 60 sea miles at latitude 45° = 69·055 statute miles.
Length of one degree of latitude or 60 sea miles at latitude 90° = 69·409 statute miles.
Length of a degree of longitude at latitude 0° or 60 geographical miles = 69·173 statute miles.
Length of a degree of longitude at latitude 45° = 48·996 statute miles.
Length of a degree of longitude at latitude 90° = 0·000 statute miles.
Length of a nautical mile in latitude 0° = 6045·93 feet.
Ditto ditto ditto 45° = 6076·82 feet.
Ditto ditto ditto 90° = 6107·98 feet.
Length of a mean nautical or sea mile = 6076·91 feet or 2025·63 yards or 1·1509 statute mile.
Length of a geographical mile = 1·1529 statute mile.
An admiralty knot = 6080 feet or 2026⅔ yards.
A statute mile = 5280 feet or 1760 yards.
A cable's length is assumed to be about $\frac{1}{10}$ of a sea mile or equal to about 100 fathoms.

CONVENTIONAL SIGNS ON ENGLISH ADMIRALTY CHARTS.

(*See* Plate XVIII.)

1. Cliffy coast line.
2. Shore, steep to.

3. Sandy shore.
4. Mangroves.
5. Sand hills.
6. Trees.
7. Cultivated ground and gardens.
8. Grass and meadow land.
9. Swampy, marshy, or mossy ground.
10. Rocky ledges which cover and uncover.
11. Rocks with less than 6 feet at low water.
12. Rocks awash at low water.
13. Isolated rocks, which do not cover, or are dry at high water springs.
14. Sand that dries at low water.
15. Sandy beach (dry at low water).
16. Sand with gravel mixed (dry at low water).
17. Sand with mud mixed (dry at low water).
18. Gravel or shingle bank and beach (dry at low water).
19. Stone bank and beach (dry at low water).
20. Mud bank and beach (dry at low water).
21. Coral reef.
22. Kelp.
23. Rocks with limiting danger line.
24. Shoal banks, which do not uncover, where the depth is known.
25. (i.) Signifies 1 fathom and less.
    (ii.) Ditto 3 fathoms
    (iii.) Ditto 5 ditto
    (iv.) Ditto 10 ditto
    (v.) Ditto 20 ditto
    (vi.) Ditto 100 ditto
26. Signifies no bottom found at the depth expressed.
27. Rock or shoal whose existence is known, but the position doubtful.
28. Reported rock or shoal whose existence is doubtful.
29. Can buoys.
30. Nun buoys.
31. Buoys with beacons.
32. Spar buoys.
33. Mooring buoys.
34. Breakers, overfalls and tide rips.
35. Anchorage for large vessels.
36. Anchorage for small vessels.
37. Churches.
38. Windmills.
39. Villages and towns.
40. Lighthouses, position of.
41. Floating Light-vessels (*with as many masts and balls as there are lights, forming distinguishing marks by day*).
42. At high water, full and change of the moon, the hour is expressed in roman figures.
43. Current.

(i.) Flood tide stream.
(ii.) Ebb tide stream.
44. Compass for courses and bearings drawn on the magnetic meridian.

ABREVIATIONS.

Quality of the Bottom.

b.	blue.
blk.	black.
br.	brown.
brk.	broken.
c.	course.
cl.	clay.
crl.	coral.
d.	dark.
f.	fine.
g.	gravel.
gn.	green.
grd.	ground.
gy.	gray.
h.	hard.
m.	mud.
oys.	oysters.
oz.	ooze.
peb.	pebbles.
r.	rock.
rot.	rotten.
s.	sand.
sft.	soft.
sh.	shells.
spk.	speckled.
st.	stones.
stf.	stiff.
w.	white.
wd.	weed.
y.	yellow.

General.

Alt. (near a light)	Alternating.
Anch$^{ge.}$	Anchorage.
B.	Bay.
B. (near a buoy)	Black.
Bat$^{y.}$	Battery.
B$^{k.}$	Bank.
C.	Cape.
C. G.	Coast Guard.
Cath.	Cathedral.
Ch.	Church.
Chan.	Channel.
Cheq. (near a buoy)	Chequered.

Col$^{d.}$	Coloured.
Cr.	Creek.
E. D.	Existence doubtful.
Fl$^{g.}$ L$^{t.}$	Floating light.
Fms.	Fathoms.
Ft.	Feet.
G.	Gulf.
Gt.	Great.
H.	Hour.
H$^{d.}$	Head.
Ho.	House.
H$^{r.}$	Harbour.
H. S. (near a buoy)	Horizontal stripes.
H. W.	High water.
H.W.F.&C.	High water full and change.
I.	Island.
I$^{s.}$	Islands.
Kn.	Knots.
L.	Lake.
Lat.	Latitude.
Long.	Longitude.
L$^{t.}$	Light.
L$^{t.}$ F.	Light fixed.
L$^{t.}$ Fl.	Light flashing.
L$^{t.}$ Int.	Light intermittent.
L$^{t.}$ Rev.	Light revolving.
L. W.	Low water.
Mag^{z}.	Magazine.
Mag^{c}.	Magnetic.
Min. (near a light)	Minutes.
M$^{t.}$	Mountain.
Np.	Neaps.
Obs$^{n.}$ spot.	Observation spot.
P.	Port.
P. D.	Position doubtful.
P$^{k.}$	Peak.
P$^{t.}$	Point.
R.	River.
R. (near a buoy)	Red.
R$^{f.}$	Reef.
R$^{k.}$	Rock.
S$^{d.}$	Sound.
Sec. (near a light)	Seconds.
Sh.	Shoals.
Sp.	Springs.
Str.	Strait.
Tel.	Telegraph.
Var$^{n.}$	Variation.
Vil.	Village.
Vis. (near a light)	Visible.
V. S.	Vertical stripes.

W. (near a buoy) White.
W. Pl. Watering place.
Occ. (near a light) Occulting.

AUSTRO-HUNGARY.

Austria adopts the meridian of Greenwich. The sea mile = English nautical mile.

Soundings are expressed in fathoms (Klafter) 6·2226 English feet.

Conventional Signs for the Coast Survey of the Austro-Hungarian Monarchy, $\frac{1}{25000}$ $\frac{1}{75000}$. (*See* Plate XIX.)

1. Lighthouse.
2. Beacon or buoy.
3. Fixed buoy (masonry).
4. Floating buoy.
5. Pilots.
6. Bollard.
7. Harbour light.
8. Telegraph (signal) tower.
9. Landing place for sailing ships.
10. Ditto rowing boats.
11. Steam navigation station.
12. Anchorage of large vessels.
13. Ditto small vessels.
14. Docks for men-of-war.
15. Docks for merchantmen.
16. Commercial harbours.
17. War harbours.
18. Chief war harbours
19. Banks with breakers.
20. Banks without breakers under 10 metres (32·8 feet) deep.
21. Ditto over ditto
22. Unsafe rocky bottom.
23. 1 fathom line (1·9 metres or 6·2226 English feet).
24. 2½ fathom line (4·75 metres or 15·556 English feet).
25. 5 fathom line (9 metres or 31·112 English feet).
26. Limit of sight for fixed lights.
27. Ditto revolving or flashing light.
28. Currents (sea miles per hour).

FRANCE.

The French adopt the Paris meridian, assumed to be in longitude 2° 20′ 9″·4 east of Greenwich.

Soundings are expressed thus:—

French fathom on old charts (Brasse) = 5·329 English feet = 0·888 English fathom.

French metre (mètre) = 3·281 English feet = 0·547 English fathom.

Sometimes upon plans of harbours the soundings are given in feet.

Marine league = $\frac{1}{20}$ of a degree of meridian (mean) = 5555·5 metres or 3·452 English statute miles.

The nautical mile is the same as the English.

For notice of atlas of Ports of France, see under Land surveys, page 47.

The Conventional Signs are generally the same as those for the Staff Map $\frac{1}{80000}$, the soundings are explained on each chart.

ABBREVIATIONS.

Quality of Bottom as expressed in French Charts.

A.	Argile.	Clay.
Cor.	Corail.	Coral.
Gr.	Gravier.	Gravel.
V.	Vase.	Mud.
R.	Roche.	Rock.
S.	Sable.	Sand.
Coq.	Coquille.	Shells.
P.	Pierre.	Stones.
H.	Goëmon.	Sea Weed.
fin	Fin.	Fine.
g.	Gros.	Coarse.
d.	Dure.	Stiff.
m.	Molle.	Soft.
n.	Noire.	Black.
r.	Rouge.	Red.
j.	Jaune	Yellow.

GERMANY.

Charts are published by the Hydrographic Office of the Admiralty at Hamburg, which was established in 1866 after the North German Confederation.

Many hydrographic surveys have been done in the Pacific by the men-of-war, "Ariadne" "Bismarck" "Albatross," and ships stationed in China and Japan. Kerguelin island was surveyed in 1874 by the Venus expedition in the "Gazelle." The harbours of Morocco have been surveyed also.

Prussia adopts the meridian of Greenwich.

Soundings are expressed in fathoms (Faden) 6·17832 English feet or 1·02972 English fathoms.

Name of Chart.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Sailing chart of the southern portion of the Baltic.	$\frac{1}{400000}$	1860	1	Hydrographic Office, Admiralty.	2nd revised edition.
Mouths of the Jade, Weser, and Elbe; and the special chart of the Eider.	$\frac{1}{50000}$	1868	6	Ditto	
Chart of the West Coast of Schleswig-Holstein.	$\frac{1}{100000}$	1869	2	Ditto	
Chart of the German coast of the North Sea.	$\frac{1}{300000}$	1870	..	Ditto	
Special chart "der Kieler Föhrde."	$\frac{1}{5000}$ and $\frac{1}{10000}$	1870	..	Ditto	
Sailing chart for the southern portion of the North Sea.	$\frac{1}{800000}$	1877	..	Ditto	
General sailing chart of the North Sea.	$\frac{1}{1500000}$	1879	..	Ditto	
Mouths of the Jade, Weser, and Elbe.	$\frac{1}{100000}$	1880	1	Ditto	Surveyed in the gunboat *Drache* by Capt. Holzhauer.
Special chart of the Jade and Weser.	„	„	..	Ditto	
Chart of the coast of Schleswig-Holstein. S. Sheet (Eider Mouth).	„	„	..	Ditto	
Chart of the East Frisian Islands, from Schirmonikoog to Wangeroog.	„	„	..	Ditto	
Chart of the North Sea from Cromer and Dungeness to the coasts of Holland, Belgium and France between Terschelling and Cape Griz Nez.	$\frac{1}{300000}$	1878	..	Ditto	
Chart of the Skagerrak.. ..	„	1880	..	Ditto	
Chart of Kattegat	„	„	..	Ditto	
Chart of English Channel ..	$\frac{1}{600000}$	„	..	Ditto	
Special chart of Wilhelmshaven	..	1879	..	Ditto	
Chart of Schleswig-Holstein, east coast.	..	1875 to 1877	..	Ditto	
Chart of Mecklenburg coast (Sec. I, II, III).	..	„	..	Ditto	
Special charts of the Aaröe and Alsen Sounds.	..	„	..	Ditto	
Special charts of Flensborg and Kiel Harbours.	..	„	..	Ditto	
Special chart of Fehmern Sound	..	„	..	Ditto	
Special charts of Bays of Eckernforde and Neustadt.	..	„	..	Ditto	
Sailing chart of the Central Baltic.	$\frac{1}{600000}$	1880	..	Ditto	

Name of Chart.	Scale.	Date.	No. of Sheets published.	By whom published.	Remark.
Chart of East and West Prussia	..	1880	..	Hydrographic Office, Admiralty.	Surveys by Capt. Hoffmann from 1875 to 1879, and published in 1880.
Special chart of Konigsberg Harbour.	..	„	..	Ditto	
Chart of the Pomeranian coast as far as Swinemünde (Secs. VIII, VII, VI, V).	..	„	..	Ditto	
Chart of the Pomeranian coast and the Rugen Waters.	..	1881	..	Ditto	
Special chart of the Gulf of Stettin.	..	„	..	Ditto	
Special chart of Kiel Harbour..	$\frac{1}{12500}$	„	..	Ditto	
Sailing chart for the western portion of the Baltic with the Sound and the Great Belt.	..	„	..	Ditto	
Wilhelmshaven	$\frac{1}{20000}$	„	..	Ditto	
Charts of the Sound, Great Belt, and the "Kattegat,"	$\frac{1}{50000}$ $\frac{1}{10000}$	1877 to 1880	7	Ditto	Compiled from the latest Danish and Swedish surveys.
Harbour of Puerto Plata in Haiti.	..	..	..	Ditto	
Harbour of Sabanilla at the mouth of the Magdalen River in Columbia.	..	..	..	Ditto	
Harbours on the Coast of Morocco.	..	..	..	Ditto	
Pakhoi Harbour..	..	..	..	Ditto	
Guie Chow Island	..	..	..	Ditto	
Wenchau Harbour (China) ..	..	..	..	Ditto	
East Coast of Russia	..	..	..	Ditto	One of the most important works of the Admiralty is to provide charts of the east coast of Russia for those in existence are in Russian, and are of no use to German sailors.
Sailing directions	..	..	..	Ditto	Sailing directions have also been published to supplement charts, and also a handbook of Navigation 1879, showing the employment of nautical instruments, &c.

CONVENTIONAL SIGNS USED UPON GERMAN CHARTS.
(*See* Plate XIX.)

1. Coast—*margin of burnt umber.*
2. Beach, dry at ordinary high water—*col. burnt umber.*
3. High bank ditto —*col. burnt umber.*
4. Dry at low water spring tides—*col. burnt umber.*
5. One fathom line—*col. burnt umber.*
6. Three fathom line—*col. blue.*
7. Five ditto
8. Ten ditto
9. Direction of current.

ABBREVIATIONS.

Quality of Bottom as expressed in German Charts.

L. or Schl.	Lehm. or Schlick.	Clay.
K.	Korallen.	Coral.
g. s.	Grobsand.	Gravel.
Sch.	Schlemm.	Mud.
F.	Fels.	Rock.
S. or Sd.	Sand.	Sand.
M.	Muscheln.	Shells.
St.	Steine.	Stones.
G.	Gras.	Weeds.
f.	Fein.	Fine.
g.	Grob.	Coarse.
Z.	Zäh.	Stiff.
W.	Weich.	Soft.
schw.	Schwarz.	Black.
	Roth.	Red.
	Gelb.	Yellow.
P.	Pricken.	Specks.

ITALY.

The Royal observatory of Naples (sometimes referred to in Italian Charts) is assumed to be in longitude 14° 14′ 43″ east of Greenwich.

An atlas of the Adriatic sea was published by the Military Geographical Institute at Milan (moved in 1839 to Vienna), assisted by Neapolitan Officers, in 2 sheets $\frac{1}{500000}$, also with 30 sheets of details $\frac{1}{175000}$, and 100 views of the principal seaports, from 1817 to 1830.

The nautical mile is the same as the English sea mile. Upon some charts the soundings are given in French feet.

Name of Charts.	Scale.	Date.	No. of sheets published.	By whom published.	Remarks.
Map of the coast of the Adriatic Sea.	$\frac{1}{173543}$	1822 1824	20	Istituto Geografico Militare di Milano	In 20 sheets. Soundings in French feet.
Sardinian Coast	$\frac{1}{10000}$		..	Minister of Marine	
Sardinian Coast, northern portion.	$\frac{1}{25000}$		..	Ditto	
Italian Coasts	$\frac{1}{100000}$		..	Ditto	
Italian Ports	$\frac{1}{5000}$			Ditto	

CONVENTIONAL SIGNS UPON ITALIAN CHARTS, $\frac{1}{173543}$.

(*See* Plate XIX.)

1. Anchorage for men-of-war of the first class.
2. Ditto second class and merchantmen.
3. Soundings in French feet, and reduced to mean low water.
4. Direction of current.
5. Rocks on coast line.
6. Coast not reached by high water.
7. Coast at low water.
8. Sand bank above water.
9. Ditto below water.
10. Rocks at water level.
11. Swampy ground.
12. Marsh with rushes.
13. Forest of oaks.
14. Forest of pines.
15. Rivers and canals not navigable.
16. Ditto navigable.
17. Dam or dike.
18. Boundary of province.
19. Frontier of kingdom.

Quality of Bottom as expressed on the Italian Charts.

Argila.	Clay.
Corállo.	Coral.
Rena. or Ghiaja.	Gravel.
Fango.	Mud.
Roccia.	Rock.
Sabbia or Aréna.	Sand.
Conchiglia.	Shells.
Pietre.	Stones.
Alga.	Weed.
Fino.	Fine.
Grosso.	Coarse.
Tenace.	Stiff.

Molle.	Soft.
Nero.	Black.
Rosse.	Red.
Giallo.	Yellow.
Creta.	Chalk.

THE NETHERLANDS.

Holland adopts the meridian of Greenwich, 4°·53′ 3·81″ west of Amsterdam.

The nautical mile is $\frac{1}{20}$ of a degree of meridian (mean), or about 6076 English yards or 3·4521 English statute miles or 3 English mean nautical miles.

On the older charts soundings are expressed in "vadem," equal to 5·575 English feet or 1·029 English fathom; on more recent charts they are expressed in metres being reduced to mean low water.

CONVENTIONAL SIGNS. (*See* Plate XX.)

1. High rocky coast.
2. Shelving coast.
3. Low coast with sandy shore.
4. Coast line and coral shore.
5. Sand hills.
6. Grass or pasture ground.
7. Marshy ground.
8. Shoal ground.
9. No bottom found at the depth indicated.
10. Sunken rocks at 80 decimetres depth (26·247 English feet).
11. Sunken rocks at less than 80 decimetres depth.
12. Sunken rocks at less than 50 decimetres (16·4 English feet).
13. Sunken rocks at less than 25 decimetres (8·2 English feet).
14. Rocks dry at low water.
15. Rocks always above water.
16. Dike with flood gate (culvert).
17. Dike with sluice gates.
18. Trees.
19. Positions determined.
    (*a*) by triangulation.
    (*b*) by construction.
20. Towers.
21. Mills.
22. (*a*) Anchorage for small ships.
    (*b*) Ditto large ships.

23. Lightships with as many masts as lights.
24. (*a*) Awash at low water.
    (*b*) 25-decimetre line (8·2 English feet).
    (*c*) 50-decimetre line (16·4 English feet).
    (*d*) 80-decimetre line (26·24 English feet).
25. Sand bank at depth of less than 80 decimetres (26·247 English feet).
26. Sand bank at depth of less than 50 decimetres (16·4 English feet).
27. Sand bank at depth of less than 25 decimetres (8·2 English feet).
28. Sand exposed at low water.
29. Sand not covered at high water.
30. White buoys, ordinary or conical buoys.
31. Black buoys, ditto
32. Red buoys, ditto
33. Chequered buoys, ditto
34. Mooring buoys, ordinary or conical buoys.
35. White buoys, mooring or elliptical buoys.
36. Black buoys, ditto
37. Red buoys, ditto
38. Chequered buoys, ditto
39. Floating beacons.
40. Fixed beacons.
41. Fort, battery, government house.
42. (*a*) Direction of current.
    (*b*) Flood tide.
    (*c*) Ebb tide.
43. Wreck.

Abbreviations.

B.	Mountain.
G$^{g.}$	Mountain (Malay).
B$^{e.}$	Latitude.
B$^{k.}$	Bank.
B$^{t.}$	(near a buoy) Chequered.
BT.	Doubtful existence.
?	Ditto
Dec.	Decimetre.
Do.	Village.
K$^{g.}$	Ditto (Malay).
Dr.	Sandbank.
E.	Island.
P.	Ditto (Malay).
G.	Gulf.
GM.	German Geographical mile (4·6 English stat. miles).
G$^{t.}$	Great.
B$^{r.}$	Great (Malay).
H.	Cape or head.
O$^{g.}$	Ditto (Malay).

H^{n}.	Port; harbour.
HS.	(near a buoy) Horizontal stripes.
H & LW.	High and low water.
V & NM.	Full and new moon.
K^{k}.	Creek, bay.
S^{y}.	Ditto (Malay).
K^{l}.	Canal.
K^{n}.	Small.
K^{ll}.	Ditto (Malay).
K^{p}.	Cape.
T^{g}.	Ditto (Malay).
L^{e}.	Longitude.
LO.	Position doubtful.
LS.	Light-ship.
L^{t}.	Light.
L^{t}. V.	Fixed light.
L^{t}. F.	Flashing light.
L^{t}. D.	Revolving light.
M^{a}.	"Moewara."
M.	Metre.
M^{2}.	Square metre.
Misw.	Declination (compass).
N.	North.
O.	East.
P^{k}.	Peak (summit of mountain).
P^{lt}.	A flat or sandbank.
P^{t}.	Point.
R.	River.
K.	Ditto (Malay).
R^{e}.	Road (anchorage).
R^{f}.	Reef.
Ka.	Ditto (Malay).
R^{s}.	Rocks.
Ba.	Ditto (Malay).
Sec.	Second.
Str.	Straits.
Tel.	Telegraph.
U.	Hour.
V^{m}.	Fathom (5·575 English feet or ·929 English fathom).
VS.	(near a buoy) Vertical stripes.
VW.	Fresh water.
Wi.	(near a buoy) White.
W.	West.
Z.	South.
Z^{br}.	(near a light) Visible.
IVX	Roman figures for the hour of high water near full and new moon.
o/m	Over the mean.

Quality of Bottom.

b.	blue.
br.	brown.
brk.	broken.
d.	dark.
de.	first stratum after clearing away mud.
f.	fine.
grd.	ground.
$g^{l.}$	yellow.
$g^{n.}$	green.
gr.	coarse.
$g^{s.}$	dust.
$g^{y.}$	gray.
h.	hard.
kl.	clay.
ko.	coral.
m.	mud.
mos.	mussels.
oes.	oysters.
r.	rock.
rd.	red.
sh.	shells.
sb.	ooze.
sk.	anchorage.
sp.	speckled.
st.	stone.
ve.	marsh.
w.	white.
wr.	seaweed.
z.	sand.
zt.	soft.
zw.	black.

NORWAY.

Norway adopts the meridian of Greenwich.

There are published sea coast charts of $\frac{1}{100000}$ and $\frac{1}{200000}$ bottom contours 10 Fod, 10·297 English feet, apart. Also sailing charts, *i. e.* general charts $\frac{1}{350000}$, $\frac{1}{800000}$, $\frac{1}{200000}$ and special charts $\frac{1}{100000}$ and $\frac{1}{50000}$.

Soundings on Norwegian charts are expressed in "Favn" (6·175 English feet or 1·029 English fathom).

The nautical mile is equal to 4·603 English statute miles, or 1 German geographical mile, or 4 English mean nautical miles, or the $\frac{1}{15}$th part of a degree of the meridian (mean).

CONVENTIONAL SIGNS ON THE ADMIRALTY CHARTS OF NORWAY.

(*See* Plate XX.)

1. Bank above water—*col. sienna.*
2. Bank under water, depth given in favn.
3. Bank visible at low water.
4. Rocks visible at low water (buoy at surface of water).
5. Sunken rocks (buoy) depth given in favn.
6. Wreck, depth given in favn.
7. Buoy with pole with and without "broom"—*col. carmine.*
8. Buoy and rock with iron pillar—*col. carmine.*
9. Buoy without and with balloon—*col. carmine.*
10. Moorings—*col. carmine.*
11. Seamarks—*col. carmine.*
12. Wharf for ships.
13. Anchorage (harbour).
14. Anchorage for small vessels and boats.
15. Sailing course.
16. Sailing course for ships of 5 metres draught, each stroke denotes one favn, each dot one fod.
17. Light (nature written underneath).
18. Fixed light, distance visible.
19. Flashing light, distance visible.
20. Fixed and flashing light, distance visible.
21. Rapidly flashing light, distance visible.
22. Submarine telegraph.
23. Low water mark.
24. Sand hills.
25. Pilot station.
26. Life-saving station.

RUSSIA.

Russia adopts the meridian of Greenwich.

The Pulkowa observatory, near St. Petersburg (sometimes referred to in Russian charts), is assumed to be in longitude 30° 19′ 40″ east of Greenwich.

Soundings are expressed in "Sea Sajen," which are equal to English fathoms.

CONVENTIONAL SIGNS ON THE ADMIRALTY CHARTS OF RUSSIA.

(*See* Plate XXI.)

1. Low shore.
2. Tidal shore.
3. High coast.
4. Coast with cliffs.
5. Sandy beach.
6. Stony beach.

7. Rocky beach.
8. Sandstone beach.
9. Muddy beach.
10. Coast line sketched by eye.
11. Coast line from old maps.
12. Marsh.
13. Sand hills.
14. Pilot station.
15. Lifeboat station.
16. Telegraph station.
17. Post station.
18. Signal and telegraph post.
19. Well and reservoir of fresh water.
20. Light-house.
21. Tower.
22. Building with a tall chimney.
23. Beacons.
24. Crane.

Ranges of Light-house Lights.

25. Fixed light.
26. Revolving light.
27. Flashing fixed light.
28. Flashing revolving light.
29. Floating fixed light.
30. Floating revolving light.

Col. yellow with red centre.

31. Tower or beacon (range at which seen).
32. ½ fathom line.
33. 1 ditto
34. 2 ditto
35. 3 ditto
36. 4 ditto
37. 5 ditto
38. 6 foot channel (depth).
39. 12 ditto
40. 18 ditto
41. 24 ditto
42. Rocks below water.
43. Rocks above water.
44. Rocks sometimes covered by water.
45. Direction of current.
46. ditto flow.
47. ditto ebb.
48. Whirlpool.
49. Anchorage for large ships.
50. Ditto small ships.
51. Floating light.
52. Telegraph cable.
53. No bottom at depth indicated.

Quality of Bottom.

Russian	p.	sand.
,,	k.	stone.
,,	i.	mud.
,,	gl.	clay.
,,	pl.	flagstone.
,,	r.	mussels.
,,	k-p.	coarse sand.
,,	m-p.	fine sand.
,,	j-i.	quick sand.
,,	khr.	gravel.
,,	k-k.	coarse pebbles.
,,	m-k.	small pebbles.
,,	i-k.	mud with pebbles.
,,	i-p.	mud with sand.
,,	p-r.	sand with mussels.
,,	k-r.	pebbles with mussels.
,,	p-k.	sand with pebbles.

SPAIN.

Spain adopts the meridian of San Fernando, Cadiz, assumed to be in longitude 6° 12′ 24″ west of Greenwich or 5′ 22″ east of old observatory.

Soundings expressed thus:—

Spanish fathom (Braça) = 5·564 English feet = 0·927 English fathoms.

Legua Maritima = 3 Spanish sea miles or 3·458 English miles.

Spanish nautical mile = 1·1529 English stat. mile.
= 1 English geographical mile.

ABBREVIATIONS.

Quality of Bottom as expressed in Spanish charts.

	Arcillo or Barro	Clay.
Cl.	Coral	Coral.
Co.	Cascájo	Gravel.
F.	Fango or Luno	Mud.
R.	Roca	Rock.
A.	Arena	Sand.
Ca.	Conchuela	Shells.
P.	Piedra	Stones.
Al.	Alga	Weeds.
f.	Fina	Fine.
g.	Gruesco	Coarse.
	Tenaz	Stiff.
	Muelle	Soft.
	Negro	Black.
	Roxez	Red.
	Amarillo	Yellow.

UNITED STATES.

Jefferson, Gallatin and Hassler originated the idea of a Geodetic Survey of the Coast of the United States.

The Survey has been divided into 12 distinct sections, each having its own carefully-measured base; triangles have been extended from these bases until they have met.

The United States have adopted the meridian of Greenwich; the nautical mile is the same as the English.

Soundings are expressed in feet up to 18 feet, and in fathoms beyond that depth, and show the depth at mean low water.

The charts published by the United States Government are of two general descriptions, viz., Preliminary and Finished, the former are to supply immediate and pressing demands of navigation, and are issued as soon after the several surveys as is consistent with accuracy of general delineation; the latter embody *all* the information furnished by the Survey and the minutest details of hydrography and topography.

Name of Chart.	Scale.	Date.	No. of Sheets published.	By whom published.	Remarks.
Coast or in-shore ..	$\frac{1}{80000}$	..	..	United States Coast Survey	In 118 sheets.
General or off-shore (Atlantic and Gulf Coasts).	$\frac{1}{400000}$	..	..	Ditto	In 16 sheets.
Harbours, bays, anchorages, &c.	$\frac{1}{5000}$ to $\frac{1}{60000}$	..	..	Ditto	
Preliminary series ..	$\frac{1}{200000}$	..	..	..	In 33 sheets; some have been published, the rest superceded.
Sailing charts of the Atlantic Coast of the United States	$\frac{1}{1200000}$	..	..	..	In 4 sheets.
Ditto, Gulf Coast ..	..	..	..	..	In 2 sheets.
Ditto, Pacific Coast ..	..	..	..	..	In 3 sheets.

CONVENTIONAL SIGNS ON UNITED STATES CHARTS.
(*See* Plate XXI.)

1. 10 fathom line.
2. Represents bottom within respective depths of 18 feet 12 feet and 6 feet.
3. Soundings 6 feet (No. 2 is on some charts represented thus).
4. Ditto 12 feet (ditto)
5. Ditto 18 feet (ditto)
6. Sunken rock.
7. Rock awash at low water.
8. Current, end of 1st quarter, flood.

9. Current, maximum, flood.
10. Ditto 3rd quarter, flood.
11. Ditto end of 1st quarter, ebb.
12. Ditto maximum, ebb.
13. Ditto 3rd quarter, ebb.

Abbreviations.

A.	Astronomical station.	
M.	Magnetic station.	
T.	Tidal station.	
H. S.	(near a buoy)	Horizontal stripes.
P. S.	(ditto)	Perpendicular stripes.
B.	(ditto)	Black.
R.	(ditto)	Red.
$\frac{0}{180}$.	That no bottom was found at 180 fathoms.	

Quality of Bottom.

M.	Mud.
S.	Sand.
G.	Gravel.
Sh.	Shells.
P.	Pebbles.
Sp.	Specks.
C.	Clay.
bk.	Black.
wh.	White.
rd.	Red.
yl.	Yellow.
gy.	Grey.
bu.	Blue.
dk.	Dark.
lt.	Light.
hrd	Hard.
fne.	Fine.
crs.	Coarse.
brk.	Broken.
rky.	Rocky.
stk.	Sticky.

TABLE showing the Measures of Degrees and Minutes of *Latitude and Longitude* at each Degree of Latitude.

Major Semiaxis = 20926348 feet. Minor Semiaxis = 20855233 feet. Compression = $\frac{1}{294 \cdot 2}$.

Parallel of Latitude.	Length of a degree of *Longitude* at each degree of Latitude.				Length of one minute of *Longitude* at each degree of Latitude.			Length of each degree of *Latitude*.			Length of one minute of *Latitude* or *Nautical Mile* at each degree of Latitude.		
	In feet.	In minutes of latitude or nautical miles.	In geographical miles or minutes of equator.	In statute miles.	In feet.	In geographical miles.	In statute miles.	In feet.	In geographical miles.	In statute miles.	In feet.	In geographical miles.	In statute miles.
0°	365233·7	60·410	60 000	69·173	6087·23	1·000	1·1529	362755·6	59·587	68·704	6045·93	·993	1·145
1°	365178·4	60·400	59·991	69·162	6086·31	·999	1·1529	362756·7	59·587	68·704	6045·94	·993	1·145
2°	365012·7	60·373	59·964	69·131	6083·54	·999	1·152	362760·1	59·587	68·704	6046·00	·993	1·145
3°	364736·5	60·326	59·918	69·078	6078·94	·998	1·151	362765·7	59·588	68·706	6046·09	·993	1·145
4°	364350·0	60·261	59·854	69·005	6072·50	·997	1·150	362773·6	59·589	68·707	6046·23	·993	1·145
5°	363853·2	60·177	59·773	68·911	6064·22	·996	1·149	362783·6	59·591	68·709	6046·39	·993	1·145
6°	363246·3	60·074	59·673	68·796	6054·11	·995	1·147	362795·9	59·593	68·711	6046·60	·993	1·145
7°	362529·5	59·954	59·556	68·661	6042·16	·993	1·144	362810·4	59·595	68·714	6046·84	·993	1·145
8°	361703·0	59·814	59·419	68·504	6028·38	·990	1·142	362827·1	59·598	68·717	6047·12	·993	1·145
9°	360767·0	59·656	59·266	68·327	6012·78	·988	1·139	362846·0	59·601	68·721	6047·43	·993	1·145
10°	359721·7	59·480	59·094	68·129	5995·36	·985	1·135	362866·9	59·605	68·725	6047·78	·993	1·145
11°	358567·6	59·285	58·905	67·910	5976·13	·982	1·132	362890·1	59·609	68·729	6048·17	·993	1·145
12°	357304·8	59·072	58·697	67·671	5955·08	·978	1·128	362915·2	59·613	68·734	6048·59	·993	1·145
13°	355933·9	58·841	58·472	67·412	5932·23	·975	1·123	362942·5	59·617	68·739	6049·04	·994	1·146
14°	354455·1	58·592	58·229	67·132	5907·59	·970	1·119	362971·8	59·622	68·745	6049·53	·994	1·146
15°	352868·8	58·325	57·968	66·831	5881·15	·966	1·114	363003·1	59·628	68·751	6050·05	·994	1·146
16°	351175·7	58·040	57·690	66·510	5852·93	·961	1·108	363036·3	59·633	68·757	6051·61	·994	1·146
17°	349376·0	57·737	57·394	66·169	5822·93	·956	1·103	363071·4	59·639	68·764	6051·19	·994	1·146
18°	347470·5	57·416	57·081	65·808	5791·18	·951	1·097	363108·4	59·645	68·771	6051·81	·994	1·146
19°	345459·5	57·077	56·751	65·427	5757·66	·946	1·090	363147·3	59·651	68·778	6052·46	·994	1·146
20°	343343·7	56·722	56·403	65·027	5722·40	·940	1·084	363187·9	59·658	68·786	6053·13	·994	1·146
21°	341123·7	56·348	56·038	64·606	5685·40	·634	1·077	363230·2	59·665	68·794	6053·84	·994	1·146
22°	338800·1	55·958	55·657	64·166	5640·67	·928	1·069	363274·3	59·671	68·801	6054·57	·994	1·147
23°	336373·6	55·550	55. 258	63·707	5606·23	·921	1·062	363320·0	59·679	68·810	6055·33	·995	1·147
24°	333845·0	55·125	54·842	63·228	5564·08	·914	1·054	363367·2	59·687	68·819	6056·12	·995	1·147
25°	331214·9	54·684	54·410	62·730	5520·25	·907	1·046	363416·0	59·694	68·828	6056·93	·995	1·147

Parallel of Latitude.	Length of a degree of *Longitude* at each degree of Latitude.				Length of one minute of *Longitude* at each degree of Latitude.			Length of each degree of *Latitude*.			Length of one minute of *Latitude* or *Nautical Mile* at each degree of Latitude.		
	In feet.	In minutes of Latitude or nautical miles.	In geographical miles or minutes of equator.	In statute miles.	In feet.	In geographical miles.	In statute miles.	In feet.	In geographical miles.	In statute miles.	In feet.	In geographical miles.	In statute miles.
26°	328484·1	54·225	53·962	62·213	5474·74	·899	1·037	363466·2	59·703	68·838	6057·77	·995	1·147
27°	325653·4	53·751	53·496	61·677	5427·56	·891	1·028	363517·9	59·712	68·848	6058·63	·995	1·147
28°	322723·6	53·259	53·015	61·122	5378·73	·883	1·019	363570·8	59·720	68·858	6059·51	·995	1·147
29°	319695·6	52·751	52·518	60·549	5328·26	·875	1·009	363625·0	59·729	68·868	6060·42	·995	1·148
30°	316570·3	52·228	52·004	59·956	5276·17	·866	·999	363680·5	59·739	68·879	6061·34	·995	1·148
31°	313348·5	51·688	51·475	59·346	5222·48	·858	·989	363737·1	59·748	68·889	6062·29	·996	1·148
32°	310031·2	51·133	50·930	58·718	5167·19	·849	·978	363794·8	59·757	68·900	6063·25	·996	1·148
33°	306619·5	50·562	50·370	58·072	5110·33	·839	·968	363853·5	59·767	68·912	6064·23	·996	1·148
34°	303114·2	49·976	49·793	57·408	5051·90	·829	·957	363913·1	59·777	68·923	6065·22	·996	1·149
35°	299516·4	49·375	49·202	56·726	4991·94	·820	·946	363973·6	59·786	68·934	6066·23	·996	1·149
36°	295827·2	48·758	48·596	56·028	4930·45	·809	·934	364034·9	59·797	68·946	6067·25	·997	1·149
37°	292047·7	48·127	47·975	55·312	4867·46	·799	·922	364096·8	59·807	68·958	6068·28	·997	1·149
38°	288178·9	47·481	47·339	54·579	4802·98	·788	·909	364159·5	59·818	68·970	6069·33	·997	1·149
39°	284222·0	46·821	46·688	53·829	4737·03	·778	·897	364222·6	59·828	68·982	6070·38	·997	1·149
40°	280178·2	46·146	46·021	53·064	4669·64	·767	·884	364286·3	59·839	68·994	6071·44	·997	1·150
41°	276048·7	45·459	45·316	52·282	4600·81	·756	·871	364350·4	59·849	69·006	6072·51	·997	1·160
42°	271834·7	44·757	44·654	51·484	4530·58	·744	·858	364414·9	59·859	69·018	6073·58	·998	1·150
43°	267537·5	44·042	43·948	50·670	4458·96	·732	·845	364479·6	59·869	69·030	6074·66	·998	1·150
44°	263158·3	43·313	43·229	49·840	4385·97	·720	·830	364544·4	59·880	69·042	6075·74	·998	1·151
45°	258698·4	42·571	42·495	48·996	4311·64	·708	·816	364609·4	59·891	69·055	6076·82	·998	1·151
46°	254159·2	41·817	41·750	48·136	4235·99	·696	·802	364674·4	59·902	69·067	6077·91	·998	1·151
47°	249541·9	41·050	40·992	47·262	4159·03	·683	·788	364739·3	59·912	69·079	6078·99	·998	1·151
48°	244818·2	40·270	40·220	46·373	4080·80	·670	·773	364804·1	59·923	69·092	6080·07	·998	1·151
49°	240079·2	39·479	39·437	45·469	4001·32	·657	·758	364868·6	59·934	69·104	6081·14	·999	1·152
50°	235236·5	38·676	38·642	44·552	3920·61	·644	·743	364932·9	59·944	69·116	6082·22	·999	1·152
51°	230321·4	37·861	37·834	43·621	3838·69	·630	·727	364996·8	59·954	69·128	6083·28	·999	1·152
52°	225335·5	37·035	37·015	42·677	3755·59	·617	·711	365060·2	59·965	69·140	6084·34	·999	1·152
53°	220280·2	36·198	36·185	41·720	3671·34	·603	·695	365123·1	59·975	69·152	6085·39	·999	1·152
54°	215157·2	35·350	35·343	40·749	3585·95	·589	·679	365185·4	59·986	69·164	6086·42	·999	1·153

55°	209968·0	34·492	34·400	39·766	3499·47	·578	·663	365247·0	59·996	69·176	6087·45	·999	1·153
56°	204714·0	33·623	33·627	38·771	3411·90	·560	·646	365307·9	60·006	69·187	6088·47	1·000	1·153
57°	199396·9	32·745	32·754	37·765	3323·28	·546	·629	365367·0	60·015	69·198	6089·47	1·000	1·153
58°	194018·3	31·856	31·870	36·746	3233·64	·531	·612	365427·0	60·025	69·210	6090·45	1·000	1·153
59°	188579·9	30·958	30·977	35·716	3143·00	·516	·595	365485·1	60·035	69·221	6091·42	1·000	1·154
60°	183083·3	30·051	30·074	34·675	3051·39	·501	·578	365542·2	60·044	69·231	6092·37	1·000	1·154
61°	177530·1	29·135	29·161	33·623	2958·84	·486	·560	365598·1	60·053	69·242	6093·30	1·001	1·154
62°	171922·1	28·211	28·240	32·561	2865·37	·470	·543	365652·9	60·062	69·252	6094·22	1·001	1·154
63°	166261·0	27·278	27·310	31·488	2771·01	·455	·525	365706·4	60·072	69·263	6095·11	1·001	1·154
64°	160548·6	26·337	26·372	30·407	2675·81	·439	·507	365758·5	60·080	69·272	6095·98	1·001	1·154
65°	154786·8	25·388	25·426	29·316	2579·77	·424	·488	365809·3	60·088	69·282	6096·82	1·001	1·155
66°	148976·3	24·432	24·471	28·215	2482·94	·408	·470	365858·6	60·096	69·291	6097·64	1·001	1·155
67°	143120·2	23·468	23·509	27·106	2385·34	·392	·452	365906·4	60·104	69·300	6098·44	1·002	1·155
68°	137219·7	22·498	22·540	25·989	2287·00	·376	·433	365952·7	60·112	69·309	6099·21	1·002	1·155
69°	131276·7	21·521	21·564	24·868	2187·95	·359	·414	365997·3	60·119	69·318	6099·96	1·002	1·155
70°	125293·2	20·538	20·581	23·729	2088·22	·343	·395	366040·2	60·126	69·326	6100·67	1·002	1·155
71°	119270·7	19·548	19·592	22·589	1987·85	·326	·376	366081·3	60·133	69·333	6101·36	1·002	1·155
72°	113211·4	18·553	18·596	21·441	1886·86	·309	·357	366120·7	60·139	69·341	6102·01	1·002	1·155
73°	107116·9	17·553	17·595	20·287	1785·28	·293	·338	366158·2	60·149	69·348	6102·64	1·002	1·156
74°	100989·1	16·547	16·588	19·127	1683·15	·276	·319	366193·9	60·152	69·355	6103·23	1·002	1·156
75°	94830·1	15·536	15·577	17·960	1580·50	·259	·299	366227·6	60·157	69·361	6103·79	1·002	1·156
76°	88641·6	14·521	14·560	16·788	1477·36	·243	·279	366259·6	60·162	69·367	6104·32	1·003	1·156
77°	82425·6	13·502	13·539	15·611	1373·76	·226	·260	366289·1	60·167	69·373	6104·82	1·003	1·156
78°	76184·0	12·478	12·514	14·429	1269·73	·208	·240	366316·7	60·172	69·378	6105·28	1·003	1·156
79°	69918·8	11·451	11·485	13·242	1165·31	·191	·221	366342·3	60·176	69·383	6105·71	1·003	1·156
80°	63631·8	10·421	10·452	12·051	1060·53	·174	·201	366385·8	60·179	69·387	6106·10	1·003	1·156
81°	57325·2	9·388	9·416	10·857	955·42	·157	·181	366387·1	60·183	69·391	6106·45	1·003	1·156
82°	51000·6	8·352	8·377	9·661	850·01	·139	·161	366406·3	60·186	69·395	6106·77	1·003	1·156
83°	44660·3	7·313	7·336	8·459	744·34	·122	·141	366423·2	60·189	69·398	6107·05	1·003	1·156
84°	38506·1	6·272	6·292	7·293	638·44	·105	·121	366438·0	60·191	69·401	6107·30	1·003	1·157
85°	31939·9	5·230	5·246	6·049	532·33	·087	·101	366450·5	60·193	69·403	6107·51	1·003	1·157
86°	25563·9	4·186	4·199	4·841	426·07	·069	·081	366460·7	60·195	69·405	6107·68	1·003	1·157
87°	19179·8	3·140	3·150	3·633	319·66	·053	·060	366468·7	60·196	69·407	6107·81	1·003	1·157
88°	12789·9	2·094	2·101	2·422	213·17	·035	·040	366474·4	60·197	69·408	6107·91	1·003	1·157
89°	6895·9	1·047	1·050	1·211	106·60	·017	·020	366477·9	60·198	69·409	6107·97	1·003	1·157
90°	0·0	0·000	0·000	0·000	0·00	·000	·000	366479·0	60·198	69·409	6107·98	1·003	1·157

Major Semiaxis = 20926348 feet. Minor Semiaxis = 20855233 feet. Compression = $\frac{1}{294 \cdot 2}$

Slopes expressed in Degrees and Minutes.

$\frac{1}{229} = 0^\circ\ 15'$
$\frac{1}{115} = 0^\circ\ 30'$
$\frac{1}{76} = 0^\circ\ 45'$
$\frac{1}{57} = 1^\circ\ 0'$
$\frac{1}{46} = 1^\circ\ 15'$
$\frac{1}{39} = 1^\circ\ 30'$
$\frac{1}{33} = 1^\circ\ 45'$
$\frac{1}{28} = 2^\circ\ 0'$
$\frac{1}{25} = 2^\circ\ 15'$
$\frac{1}{23} = 2^\circ\ 30'$
$\frac{1}{21} = 2^\circ\ 45'$
$\frac{1}{19} = 3^\circ\ 0'$
$\frac{1}{18} = 3^\circ\ 15'$
$\frac{1}{17} = 3^\circ\ 28'$
$\frac{1}{16} = 3^\circ\ 35'$
$\frac{1}{15} = 3^\circ\ 49'$
$\frac{1}{14} = 4^\circ\ 6'$
$\frac{1}{13} = 4^\circ\ 24'$
$\frac{1}{12} = 4^\circ\ 45'$
$\frac{1}{11\cdot5} = 5^\circ\ 0'$
$\frac{1}{11} = 5^\circ\ 12'$
$\frac{1}{10\cdot5} = 5^\circ\ 27'$
$\frac{1}{10} = 5^\circ\ 42'$
$\frac{1}{9\cdot5} = 6^\circ\ 0'$
$\frac{1}{9} = 6^\circ\ 21'$
$\frac{1}{8\cdot5} = 6^\circ\ 43'$
$\frac{1}{8} = 7^\circ\ 7'$
$\frac{1}{7\cdot5} = 7^\circ\ 36'$
$\frac{1}{7} = 8^\circ\ 8'$
$\frac{1}{6\cdot5} = 8^\circ\ 45'$
$\frac{1}{6} = 9^\circ\ 27'$
$\frac{1}{5\cdot75} = 9^\circ\ 52'$
$\frac{1}{5\cdot5} = 10^\circ\ 18'$
$\frac{1}{5\cdot25} = 10^\circ\ 47'$
$\frac{1}{5} = 11^\circ\ 19'$
$\frac{1}{4\cdot75} = 11^\circ\ 53'$
$\frac{1}{4\cdot5} = 12^\circ\ 32'$
$\frac{1}{4\cdot25} = 13^\circ\ 15'$
$\frac{1}{4} = 14^\circ\ 2'$
$\frac{1}{3\cdot75} = 14^\circ\ 55'$
$\frac{1}{3\cdot5} = 15^\circ\ 56'$
$\frac{1}{3\cdot25} = 17^\circ\ 6'$
$\frac{1}{3} = 18^\circ\ 26'$
$\frac{1}{2\cdot75} = 19^\circ\ 59'$
$\frac{1}{2\cdot5} = 21^\circ\ 48'$
$\frac{1}{2\cdot25} = 23^\circ\ 58'$
$\frac{1}{2} = 26^\circ\ 34'$
$\frac{1}{1\cdot75} = 29^\circ\ 44'$
$\frac{1}{1\cdot5} = 33^\circ\ 42'$
$\frac{1}{1\cdot25} = 38^\circ\ 40'$
$\frac{1}{1} = 45^\circ\ 0'$
$\frac{4}{3} = 53^\circ\ 8'$
$\frac{2}{1} = 63^\circ\ 28'$
$\frac{4}{1} = 75^\circ\ 58'$
$\frac{5}{1} = 78^\circ\ 41'$

Representative Fractions and their Equivalent Values from $\frac{1}{4000000}$ to $\frac{1}{4}$

Natural Scale.	Miles to 1 Inch.	Inches to 1 Mile.
$\frac{1}{4000000}$	$63\cdot\dot{1}\dot{3}$	·01584
$\frac{1}{3801600}$	60	$\cdot01\dot{6}$
$\frac{1}{3600000}$	$56\cdot\dot{8}\dot{1}$	·0176
$\frac{1}{3484800}$	55	$\cdot\dot{0}1\dot{8}$
$\frac{1}{3168000}$	50	·02
$\frac{1}{3000000}$	$47\cdot3\dot{4}\dot{8}$	·02112
$\frac{1}{2534400}$	40	·025
$\frac{1}{2400000}$	$37\cdot\dot{8}\dot{7}$	·0264
$\frac{1}{2217600}$	35	·028571
$\frac{1}{2027520}$	32	$\cdot0318\dot{3}$
$\frac{1}{2000000}$	31·56	·03168
$\frac{1}{1900800}$	30	$\cdot0\dot{3}$
$\frac{1}{1850000}$	29·1982	·034248
$\frac{1}{1680000}$	$26\cdot\dot{5}1\dot{5}$	·037714
$\frac{1}{1584000}$	25	·04
$\frac{1}{1444000}$	22·79	·04387
$\frac{1}{1267200}$	20	·05
$\frac{1}{1203840}$	19	·052631
$\frac{1}{1200000}$	$18\cdot\dot{9}\dot{3}$	·0528
$\frac{1}{1140480}$	18	$\cdot0\dot{5}$
$\frac{1}{1077120}$	17	·058823
$\frac{1}{1013760}$	16	·0625
$\frac{1}{1000000}$	15·7828	·06336
$\frac{1}{960000}$	$15\cdot\dot{1}\dot{5}$	·066
$\frac{1}{950400}$	15	$\cdot0\dot{6}$
$\frac{1}{900000}$	$14\cdot20\dot{4}\dot{5}$	·0704

Natural Scale.	Miles to 1 Inch.	Inches to 1 Mile.	Natural Scale.	Miles to 1 Inch.	Inches to 1 Mile.
$\frac{1}{887040}$	14	·071428	$\frac{1}{180000}$	$2{\cdot}84\dot{0}\dot{9}$	·352
$\frac{1}{840000}$	13·257	·07542	$\frac{1}{170000}$	2·68308	·372705
$\frac{1}{823680}$	13	·076923	$\frac{1}{160000}$	$2{\cdot}\dot{5}\dot{2}$	·396
$\frac{1}{800000}$	$12{\cdot}\dot{6}\dot{2}$	·0792	$\frac{1}{150000}$	2·36742	·4224
$\frac{1}{760320}$	12	$\cdot 08\dot{3}$	$\frac{1}{144000}$	$2{\cdot}\dot{2}\dot{7}$	·44
$\frac{1}{700000}$	11·0479	·09051	$\frac{1}{140000}$	$2{\cdot}20\dot{9}\dot{5}$	·452571
$\frac{1}{696960}$	11	$\cdot 09\dot{0}\dot{9}$	$\frac{1}{130000}$	2·05176	·48739
$\frac{1}{633600}$	10	·1	$\frac{1}{126720}$	2	·5
$\frac{1}{600000}$	$9{\cdot}4\dot{6}\dot{9}$	·1056	$\frac{1}{126000}$	$1{\cdot}988\dot{6}\dot{3}$	·50287
$\frac{1}{576000}$	$9{\cdot}\dot{0}\dot{9}$	·11	$\frac{1}{120000}$	$1{\cdot}8\dot{9}\dot{3}$	·528
$\frac{1}{570240}$	9	$\cdot\dot{1}$	$\frac{1}{100000}$	1·578	·6336
$\frac{1}{550000}$	$8{\cdot}680\dot{5}$	·1152	$\frac{1}{96000}$	$1{\cdot}\dot{5}\dot{1}$	·66
$\frac{1}{506880}$	8	·152	$\frac{1}{90000}$	1·42	·704
$\frac{1}{500000}$	$7{\cdot}89\dot{1}\dot{4}$	·12672	$\frac{1}{86400}$	$1{\cdot}\dot{3}\dot{6}$	$\cdot 7\dot{3}$
$\frac{1}{480000}$	$7{\cdot}\dot{5}\dot{7}$	·132	$\frac{1}{84000}$	1·3257	·75428
$\frac{1}{443520}$	7	·142857	$\frac{1}{80000}$	$1{\cdot}2\dot{6}\dot{2}$	·792
$\frac{1}{422000}$	$6{\cdot}660\dot{3}\dot{5}$	·1501421	$\frac{1}{75000}$	$1{\cdot}1837\dot{9}$	·8447
$\frac{1}{420000}$	6·6287	·1508	$\frac{1}{70000}$	$1{\cdot}104\dot{7}\dot{9}$	·9041
$\frac{1}{400000}$	$6{\cdot}\dot{3}\dot{1}$	·1584	$\frac{1}{63360}$	1	1
$\frac{1}{380160}$	5	$\cdot 1\dot{6}$	$\frac{1}{60000}$	$\cdot 94\dot{6}\dot{9}$	1·056
$\frac{1}{360000}$	$5{\cdot}6\dot{8}\dot{1}$	·176	$\frac{1}{57600}$	·909	1·1
$\frac{1}{320000}$	$5{\cdot}\dot{0}\dot{5}$	·198	$\frac{1}{50000}$	·78914	1·2672
$\frac{1}{316800}$	5	·2	$\frac{1}{48000}$	$\cdot\dot{7}\dot{5}$	1·32
$\frac{1}{300000}$	4·7348	·2112	$\frac{1}{40000}$	$\cdot 6\dot{3}\dot{1}$	1·584
$\frac{1}{288000}$	$4{\cdot}\dot{5}\dot{4}$	·22	$\frac{1}{36000}$	$\cdot 56\dot{8}\dot{1}$	1·76
$\frac{1}{253440}$	4	·25	$\frac{1}{35000}$	·55239	1·81028
$\frac{1}{250000}$	3·9457	·25344	$\frac{1}{31680}$	·5	2
$\frac{1}{240000}$	$3{\cdot}\dot{7}\dot{8}$	·264	$\frac{1}{30000}$	·4734	2·112
$\frac{1}{238000}$	3·7563	·266621	$\frac{1}{28800}$	$\cdot\dot{4}\dot{5}$	2·2
$\frac{1}{200000}$	$3{\cdot}1\dot{5}\dot{6}$	·3168	$\frac{1}{25000}$	·3957	2·5344
$\frac{1}{190080}$	3	$\cdot\dot{3}$	$\frac{1}{24000}$	·378	2·64

Natural Scale.	Miles to 1 Inch.	Inches to 1 Mile.	Natural Scale.	Miles to 1 Inch.	Inches to 1 Mile.
$\frac{1}{21120}$	·3	3	$\frac{1}{3500}$	·05523	18·10208
$\frac{1}{20000}$	·3156	3·168	$\frac{1}{3000}$	$\cdot 0473\dot{4}\dot{8}$	21·12
$\frac{1}{19000}$	·29987	3·33473	$\frac{1}{2640}$	$\cdot 041\dot{6}$	24
$\frac{1}{18000}$	$\cdot 2840\dot{9}$	3·52	$\frac{1}{2500}$	·03946	25·344
$\frac{1}{17000}$	·268308	3·727	$\frac{1}{2400}$	·0378	26·4
$\frac{1}{15840}$	·25	4	$\frac{1}{2376}$	·0375	26·6
$\frac{1}{15000}$	·23674	4·224	$\frac{1}{2000}$	$\cdot 031\dot{5}\dot{6}$	31·68
$\frac{1}{14400}$	$\cdot 2\dot{2}\dot{7}$	4·4	$\frac{1}{1800}$	·0284	35·208
$\frac{1}{14000}$	$\cdot 220\dot{9}\dot{5}$	4·5257	$\frac{1}{1760}$	$\cdot 02\dot{7}$	36
$\frac{1}{13000}$	·205176	4·8738	$\frac{1}{1600}$	$\cdot 0\dot{2}\dot{5}$	39·6
$\frac{1}{12672}$	·2	5	$\frac{1}{1500}$	·02367	42·24
$\frac{1}{12500}$	·19728	5·0688	$\frac{1}{1440}$	$\cdot 02\dot{2}\dot{7}$	44
$\frac{1}{12000}$	$\cdot 18\dot{9}\dot{3}$	5·28	$\frac{1}{1200}$	$\cdot 018\dot{9}\dot{3}$	52·8
$\frac{1}{11000}$	·17361	5·76	$\frac{1}{1056}$	$\cdot 0\dot{1}\dot{6}$	60
$\frac{1}{10560}$	$\cdot 1\dot{6}$	6	$\frac{1}{1000}$	·01578	63·36
$\frac{1}{10000}$	·1578	6·336	$\frac{1}{960}$	$\cdot 01\dot{5}$	66
$\frac{1}{9600}$	$\cdot \dot{1}\dot{5}$	6·6	$\frac{1}{900}$	·0142	70·4
$\frac{1}{9000}$	$\cdot 1428\dot{5}\dot{7}$	7·04	$\frac{1}{800}$	$\cdot 012\dot{6}\dot{2}$	79·2
$\frac{1}{8000}$	$\cdot 12\dot{6}\dot{2}$	7·92	$\frac{1}{736}$	$\cdot 01\dot{1}\dot{6}$	86·206
$\frac{1}{7920}$	·125	8	$\frac{1}{720}$	·01136	88
$\frac{1}{7040}$	$\cdot \dot{1}$	9	$\frac{1}{700}$	·011047	90·52
$\frac{1}{7000}$	$\cdot 1104\dot{7}\dot{9}$	9·051	$\frac{1}{600}$	$\cdot 0094\dot{6}\dot{9}$	105·6
$\frac{1}{6336}$	·1	10	$\frac{1}{528}$	·008	120
$\frac{1}{6000}$	$\cdot 094\dot{6}\dot{9}$	10·56	$\frac{1}{500}$	·00789	126·702
$\frac{1}{5760}$	$\cdot \dot{0}\dot{9}$	11	$\frac{1}{480}$	$\cdot 00\dot{7}\dot{5}$	132
$\frac{1}{5280}$	$\cdot 08\dot{3}$	12	$\frac{1}{400}$	$\cdot 006\dot{3}\dot{1}$	158·4
$\frac{1}{5000}$	$\cdot 0789\dot{1}\dot{4}$	12·672	$\frac{1}{360}$	$\cdot 0056\dot{8}\dot{1}$	176
$\frac{1}{4800}$	$\cdot 0\dot{7}\dot{5}$	13·2	$\frac{1}{300}$	·00473	211·2
$\frac{1}{4500}$	·071022	14·08	$\frac{1}{240}$	·00378	264
$\frac{1}{4200}$	·06629	15·086	$\frac{1}{200}$	$\cdot 0031\dot{5}\dot{6}$	316·8
$\frac{1}{3600}$	$\cdot 056\dot{8}\dot{1}$	17·6	$\frac{1}{144}$	$\cdot 002\dot{2}\dot{7}$	440

Natural Scale.	Miles to 1 Inch.	Inches to 1 Mile.	Natural Scale.	Miles to 1 Inch.	Inches to 1 Mile.
$\frac{1}{120}$	$\cdot 0018\dot{9}\dot{3}$	528	$\frac{1}{30}$	·000473	2112
$\frac{1}{100}$	·00157	633·6	$\frac{1}{24}$	·000378	2640
$\frac{1}{96}$	$\cdot 00\dot{1}\dot{5}$	660	$\frac{1}{20}$	$\cdot 00051\dot{5}\dot{6}$	3168
$\frac{1}{90}$	·00142	704	$\frac{1}{12}$	·000189	5280
$\frac{1}{80}$	$\cdot 0012\dot{6}\dot{2}$	792	$\frac{1}{10}$	·000157	6336
$\frac{1}{72}$	$\cdot 0011\dot{3}\dot{6}$	880	$\frac{1}{9}$	·000142	7040
$\frac{1}{70}$	$\cdot 00110\dot{4}\dot{7}$	905·14	$\frac{1}{8}$	$\cdot 00012\dot{6}\dot{2}$	7920
$\frac{1}{60}$	$\cdot 00094\dot{6}\dot{9}$	1056	$\frac{1}{7}$	·0001104	9051·4
$\frac{1}{50}$	·000789	1267·2	$\frac{1}{6}$	·000094	10560
$\frac{1}{48}$	$\cdot 000\dot{7}\dot{5}$	1320	$\frac{1}{5}$	·0000789	12672
$\frac{1}{40}$	$\cdot 0006\dot{3}\dot{1}$	1584	$\frac{1}{4}$	$\cdot 00006\dot{3}\dot{1}$	15840
$\frac{1}{36}$	$\cdot 00056\dot{8}\dot{1}$	1760			

Horizontal Equivalents, in Metres, of Contours, of which the Vertical Distances are respectively 20 *m. and* 5 *m.*

With contours 20 m. vertically apart, their distance apart in plan for slopes of—

45° is 20 m.
40° is 24 m.
35° is 29 m.
30° is 35 m.
25° is 43 m.
20° is 55 m.
15° is 75 m.
10° is 114 m.
5° is 228 m.

With contours 5 m. vertically apart, their corresponding distance apart in plan for slopes of—

10° is 28 m.
9° is 32 m.
8° is 36 m.
7° is 41 m.
6° is 48 m.
5° is 57 m.
4° is 72 m.
3° is 96 m.
2° is 143 m.
1° is 286 m.

LIST OF COLONIAL AND EXTRA-CONTINENTAL POSSESSIONS OF THE COUNTRIES OF THE WORLD.

NOTE.—The information given in this list being obtained, to a great extent, from non-official sources, must not be considered as absolutely correct, but may be taken to represent, very fairly and unauthoritatively, the possessions "*claimed*" by the several countries.

The following countries have no Colonial or Extra-Continental possessions, viz.:—Abyssinia, Argentine Republic, Austro-Hungary, Belgium, Brazil, Columbia, Costa Rica, Dominican Republic, Guatemala, Germany, Honduras, Hawaiian Islands (13), Liberia, Madagascar, Mexico, Montenegro, Morroco, Muscat, Norway, Nicaragua, New Guinea (Eastern Half), Orange Free State, Paraguay, Persia, Peru, Roumania, San Salvador, Switzerland, Sweden, Servia, Siam, Transvaal, Uruguay, and Zanzibar.

Country.	Possessions in				
	Europe.	Asia.	Africa.	America.	Oceania
Chili	None	None	None	Juan Fernandez I.	None
Chinese Empire, including the tributaries of Korea, Manchooria, Mongolia, Ili, Koko-Nor, Tibet	None	Formosa I. Hainan I.	None	None	None
Denmark..	Bornholm I. Faröe I$^{s.}$ Iceland	None	None	Greenland (*West Indies*) Santa Cruz (S^{t}. Croix) I. S$^{t.}$ Thomas I. (*Virgin I$^{s.}$*) S$^{t.}$ John I. (*Virgin I$^{s.}$*)	None
Ecuador	None	None	None	Galapagos or Tortoise I$^{s.}$	None
France	Corsica	(*India*) Pondicherry Chandernagore	Algeria Tunis	(*West Indies*) Martinique I. Guadeloupe I.	New Caledonia Loyalty I$^{s.}$ New Hebrides

		Yunaon Karikal Mahé Cochin China Cambodia Tonquin	*Senegal.* Portendik St. Louis Goree Dakar Bakel and some villages (*Coast of Guinea and River Gaboon*) Mouth of River Gaboon Grand Bassam Porto Novo (near Lagos) Réunion I. (*Madagascar*) St. Marie de Madagascar I. Mayotte I. Nossibé I. (*Red Sea*) Obock Dessi I. (in Annesley Bay) Ad (on the Danakil Coast) Sheikh Saïd	La Désirade I. Les Saintes I. Marie Galante I. St. Bartholomew I. St. Martin I. (Northern portion) French Guiana or Cayenne Clipperton I. (West Coast) St. Pierre I. Miguelon I.	Society Is. (Tahiti) windward group only Marquesas Is. Low Archipelago Gambier I. Tubuai or Austral Is.
Greece	N. and W. Sporades Is. Cyclades Is. Ionian Is.	None	None	None	None
Great Britain and Ireland	Gibraltar Heligoland Malta and Gozo	India Andaman Is. Nicobar Is.	(*Cape of Good Hope*) Cape Colony Basutoland	The Bermudas Is. Canada— Nova Scotia	Australia Lord Howe's I. New Zealand

List of Colonial and Extra-Continental Possessions of the Countries of the World—*continued.*

Country.	Possessions in				
	Europe.	Asia.	Africa.	America.	Oceania.
Great Britain and Ireland —*continued*	Cyprus ——— (*Channel Islands*) Jersey Guernsey Alderney Sark Herm	Laccadive Is. British Burmah ——— Ceylon Maldive Is. ——— Hong Kong I. Labuan I. Sarawak British Borneo ——— (*Straits Settlements*) Singapore I. Penang (Prince of Wales) I., and Province Wellesley Perak Selangor Sungei Ujong Malacca ——— (*Red Sea, &c.*) Aden and Sheikh Othman Village Perim I. Efat I. Socotra I. Mushakh I.	Griqualand East Griqualand West Tembuland Transkei St. John's River Territory ——— Walwich Bay ——— Natal ——— Mauritius I. Rodriquez I. Seychelles Is. Chagos (Diego Garcia) Is. Amirantes Is. ——— St. Helena I. Ascension I. Tristan d'Acunha I. ——— Sierra Leone Gold Coast Colony Lagos Territory ——— (*Gambia*) St. Mary's I. (Bathurst) McCarthy's I.	Hudson's Bay Territory Arctic Ocean Is. Prince Edward's I. Charlotte I. Vancouver's I. Newfoundland ——— British Guiana British Honduras Falkland Is. ——— (*West Indies*) (Leeward Is.)— Antigua Dominica Monserrat Nevis St. Christopher (St. Kitt's) Anguilla Virgin Is. (except *see* Denmark) (Windward Is.)— Barbados Grenada Grenadines St. Lucia I.	Tasmania Norfolk I. Fiji Is. Chatham I. Auckland Is. Campbell Is. Macquarie Is. ——— Fanning I. Malden I. Starbruck I. Caroline I. (part of Manihiki group) Rotuma I. ———

		Kooria Mooria I. Kamaran I. Dahlac I^{s}. St. Paul's I. Amsterdam I. Kerguelen I. Cacos (Keeling) I^{s}.	British Combo The Ceded Mile Albreda	St. Vincent I. Tobago I. Bahamas I^{s}. Jamaica Turks I. Caicos I. Tortuga I. (near Hayti) Trinidad I. Staten I. South Georgia I.	
Hayti	None	None	None	Gonave I.	None
Italy	Sardinia	None	(*Red Sea*) Colony of Assab	None	None
Japan	None	Yesso I. Great Kuriles I^{s}. Sima I. Loo Choo I^{s}. Madjioscima I^{s}. Bonin I^{s}.	None	None	None
The Netherlands ..	None	None	None	Dutch Guiana (Surinam) (*West Indies*) S^{t}. Eustatius I. Saba I. S^{t}. Martin I. (Southern portion) Bonaire (Buen Ayre) I. Curaçao I. Oruba or Aruba I.	Sumatra Bangka Billiton and adjacent islands South Borneo Natuna I. Java Balli Lombok Sumbawa

List of Colonial and Extra-Continental Possessions of the Countries of the World—*continued.*

Country.	Possessions in				
	Europe.	Asia.	Africa.	America.	Oceania.
The Netherlands—*continued*					Sumba Flores Celebes Timor (Western half) Timor Laut Banda and Booroo Ceram and adjacent islands Gilolo I. New Guinea (Western half)
Portugal	The Azores	(*India*) Goa and districts of Salsette and Bardez Town of Damaun Town of Diu (*China*) Macao Timor (Eastern half) I.	Cape Verde I$^{s.}$ Madeira I$^{s.}$ (*West Coast*) S$^{t.}$ Thomas I. Principe I. Bissagos I$^{s.}$ Angola Benguela Mossamedes (*East Coast*) Mozambique Sofala (from Delagoa Bay to Cape Delgado)	None	None

Russia	None	Little Kurile I^{s}.	None	None	None
Spain	Balearic I^{s}. Alboran I.	None	(*North Africa*) Ceuta Peñon de la Gomera Alucemas I. Melilla Chafarinas I. Santa Cruz de Mar Peguena (Agadir) Canary I^{s}. (*West Africa*) Fernando Po. Corisco I. Annobon I.	Cuba Puerto Rico	Phillipine I^{s}. Palawan I. Mariana or Ladrone I^{s}. Caroline I^{s}. Pelew I^{s}.
Turkey in Europe and Asia, including Syria and portion of Arabia	Crete I.	None	Egypt Tripoli	None	None
United States	None	None	None	Alaska	Samarang I. Christmas I. Howland I. Baker I. Arthur I. Gardner I. Penrhyn I.
Venezuela	None	None	None	(*N. Coast of S. America*) Los Roques I^{s}. Tortuga I. Margarita I.	None

A LIST OF MAP AGENTS.

AUSTRIA—	Vienna	*F. Artaria and Co., 9, Kohlmarkt.
BELGIUM—	Brussels	Lechner P. Vandermaelen (Etablissement Géographique).
		C. Muquardt.
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		Lehmann and Stage.
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		E. Andriveau-Goujon.
		Challamel, rue Jacob 5.
		Hachette (*carte vicinale*).
		Lanée, rue de la Paix 8.
		Delagrave.
		J. Gautier.
		Victor Clérot.
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		Dulau, Soho Square.
		†J. D. Potter, 31, Poultry.
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	Dublin	*Hodges, Figgis and Co., 104, Grafton Street.
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		Simon Schropp.
	Gotha	Justus Perthes.
	Stuttgard	Karl Aue.
	Leipzig	Hinrichs.
		K. F. Koehler.
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		C. Ricker.
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		Dalp.
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	Chicago	*Warner and Beers.
		*Kingman Brothers.
	Philadelphia	*Edward Butler.
		*Warner and Foote.
		*D. G. Beers.

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* For Government maps (Government Agents).
† For Admiralty charts only (Admiralty Agent).

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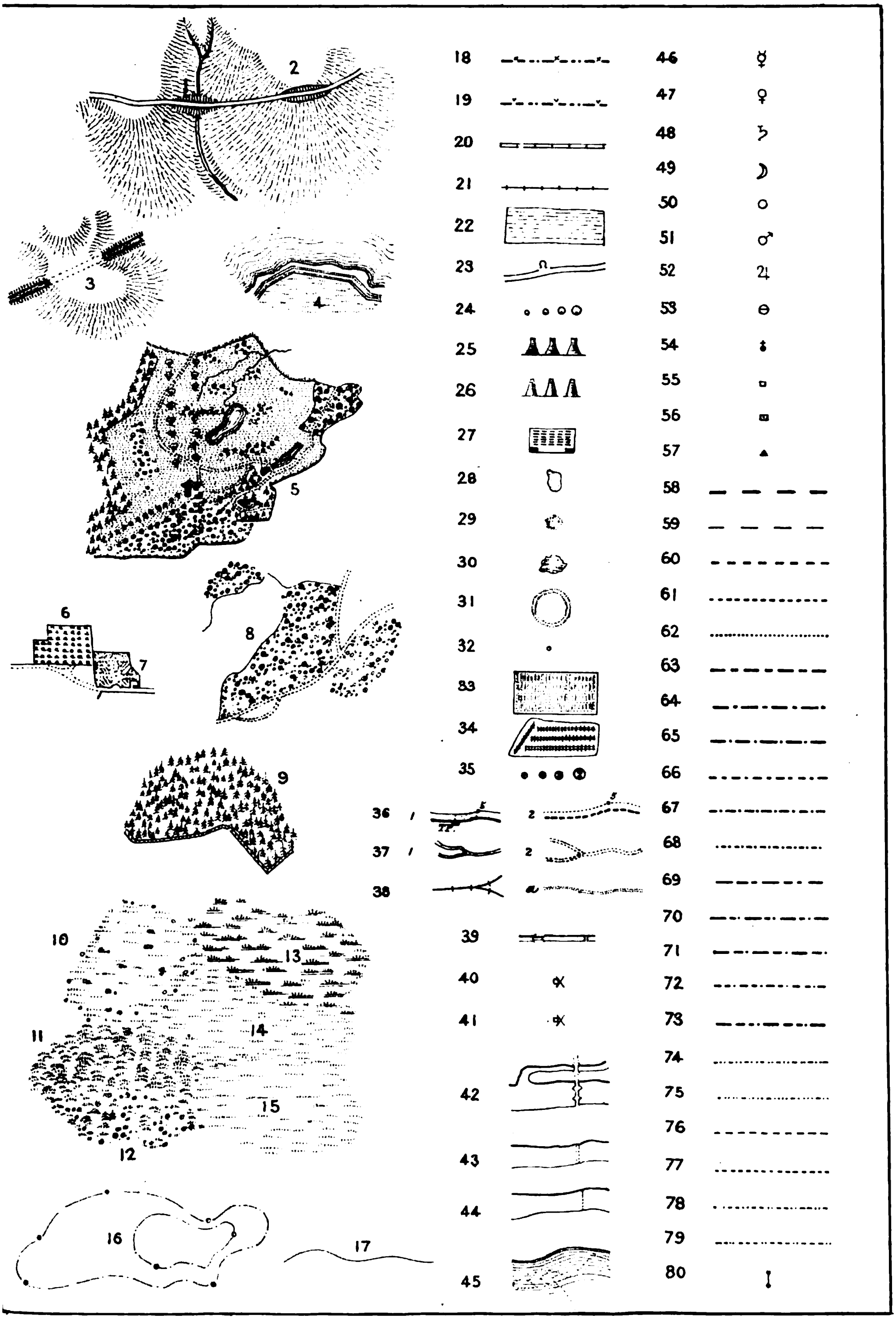
Conventional Signs on the English Ordnance Survey Maps.

(See pages 15, 16 & 17.)



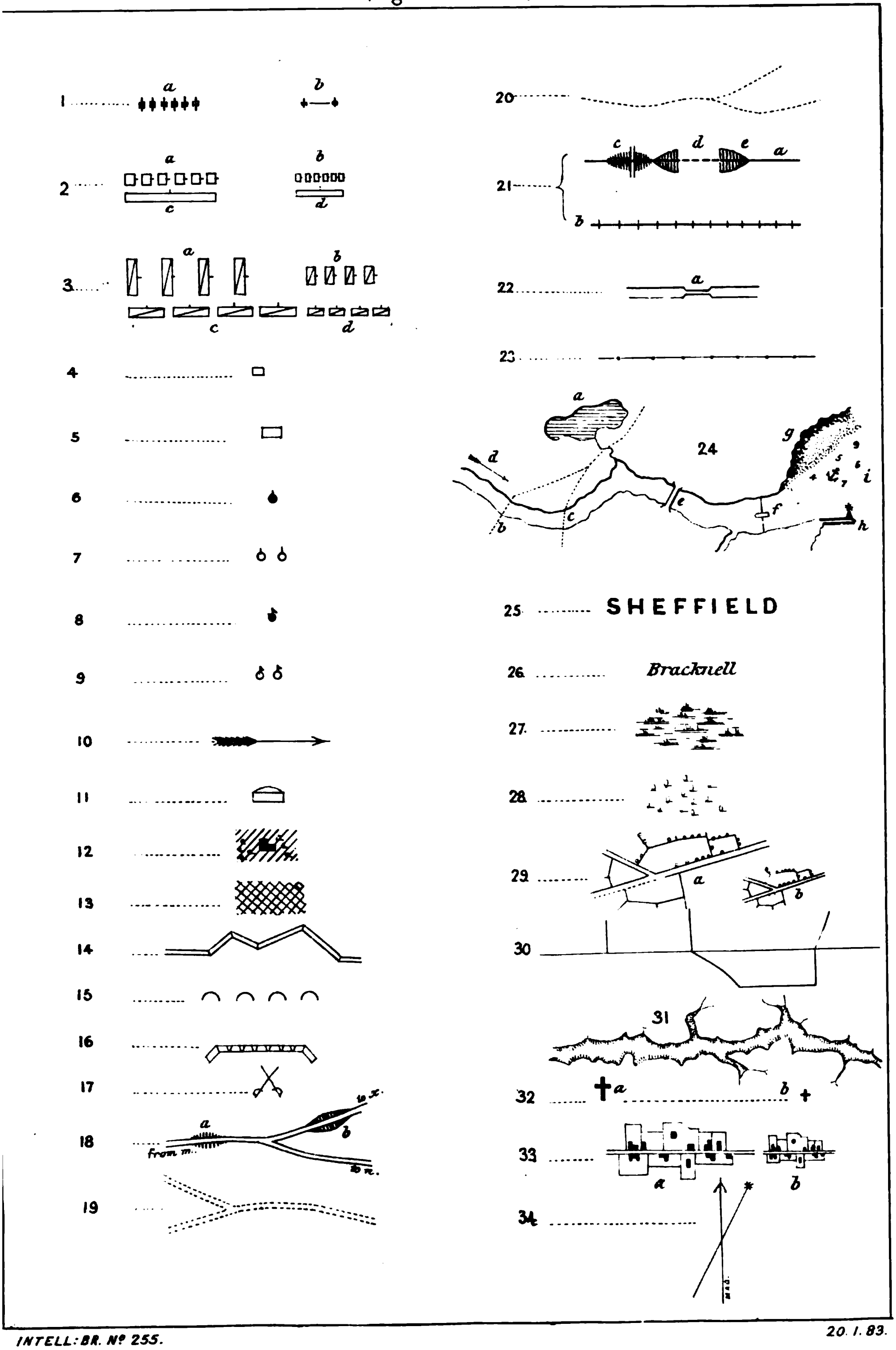
INTELL: BR. No 254.

20. 1. 83

Conventional Signs and Terms used in Military Topography.

(England.)

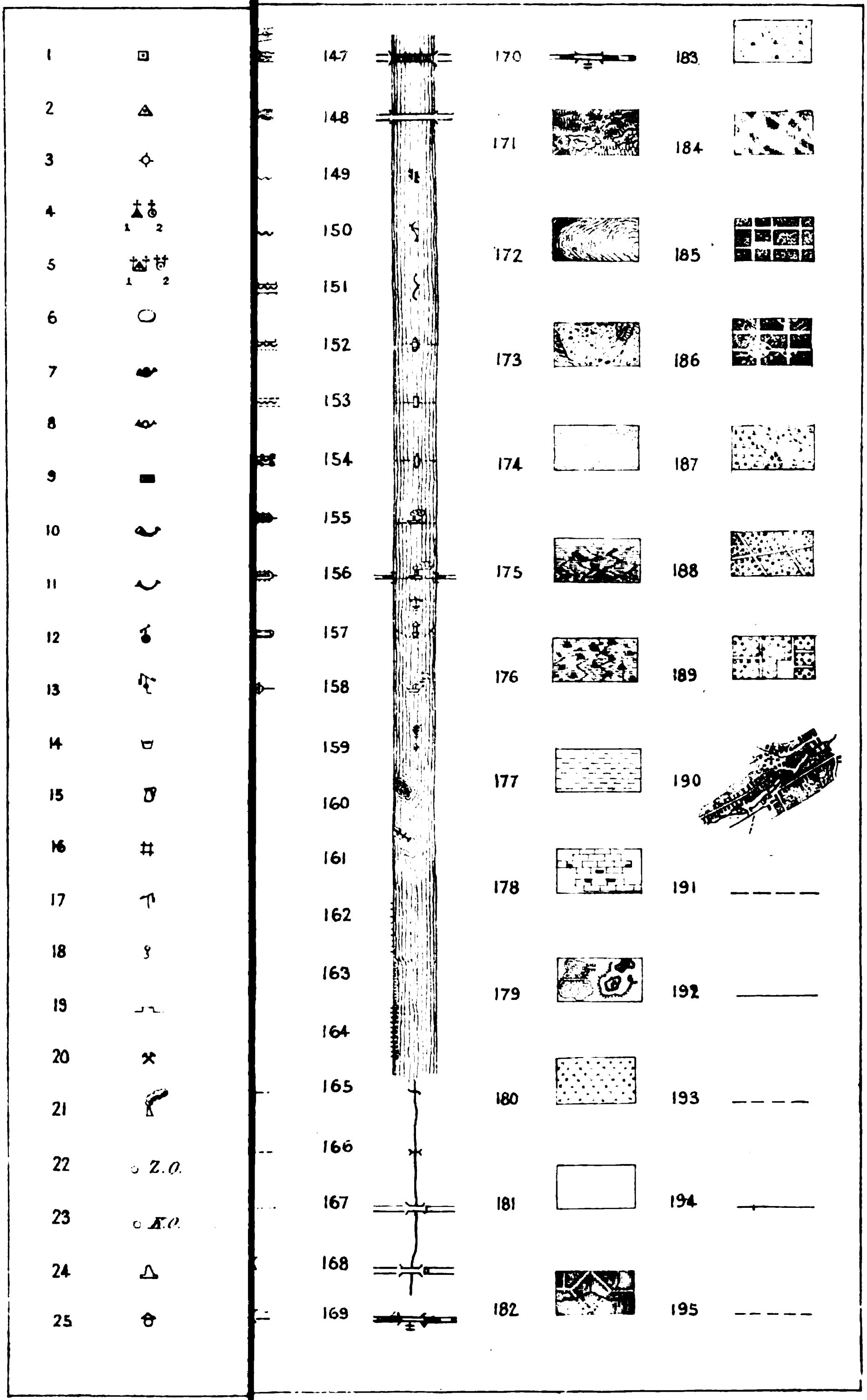
(See pages 17, 18 & 19.)



INTELL: BR. Nº 255.

20. 1. 83.

Pl. [illegible]



INTELL: BR. No 256.

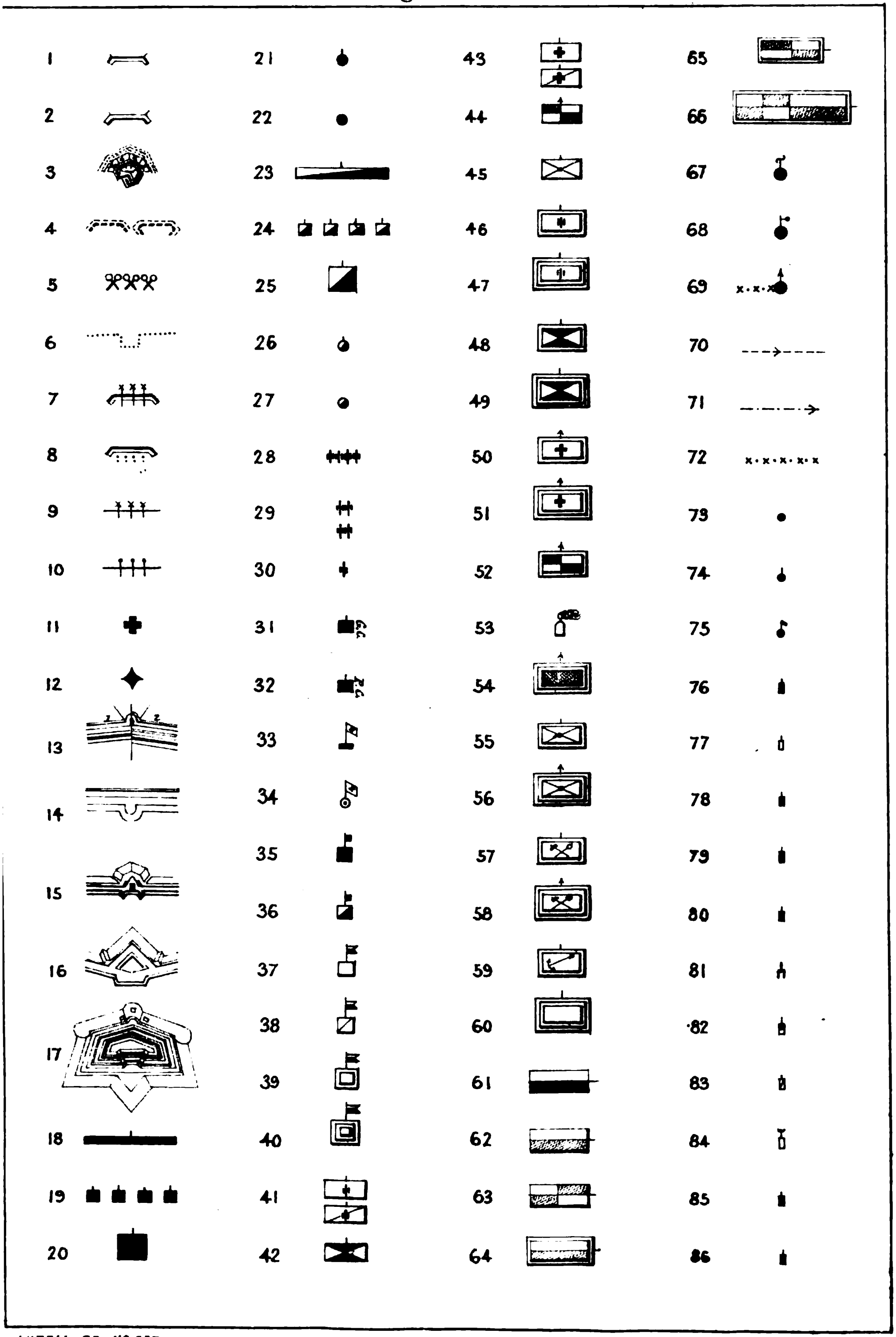
26.1.83.

Pl. IV.

Conventional Signs for Military Works, Troops & Establishments

(Austria.)

(See pages 30, 31 & 32.)



INTELL. BR. Nº 257.

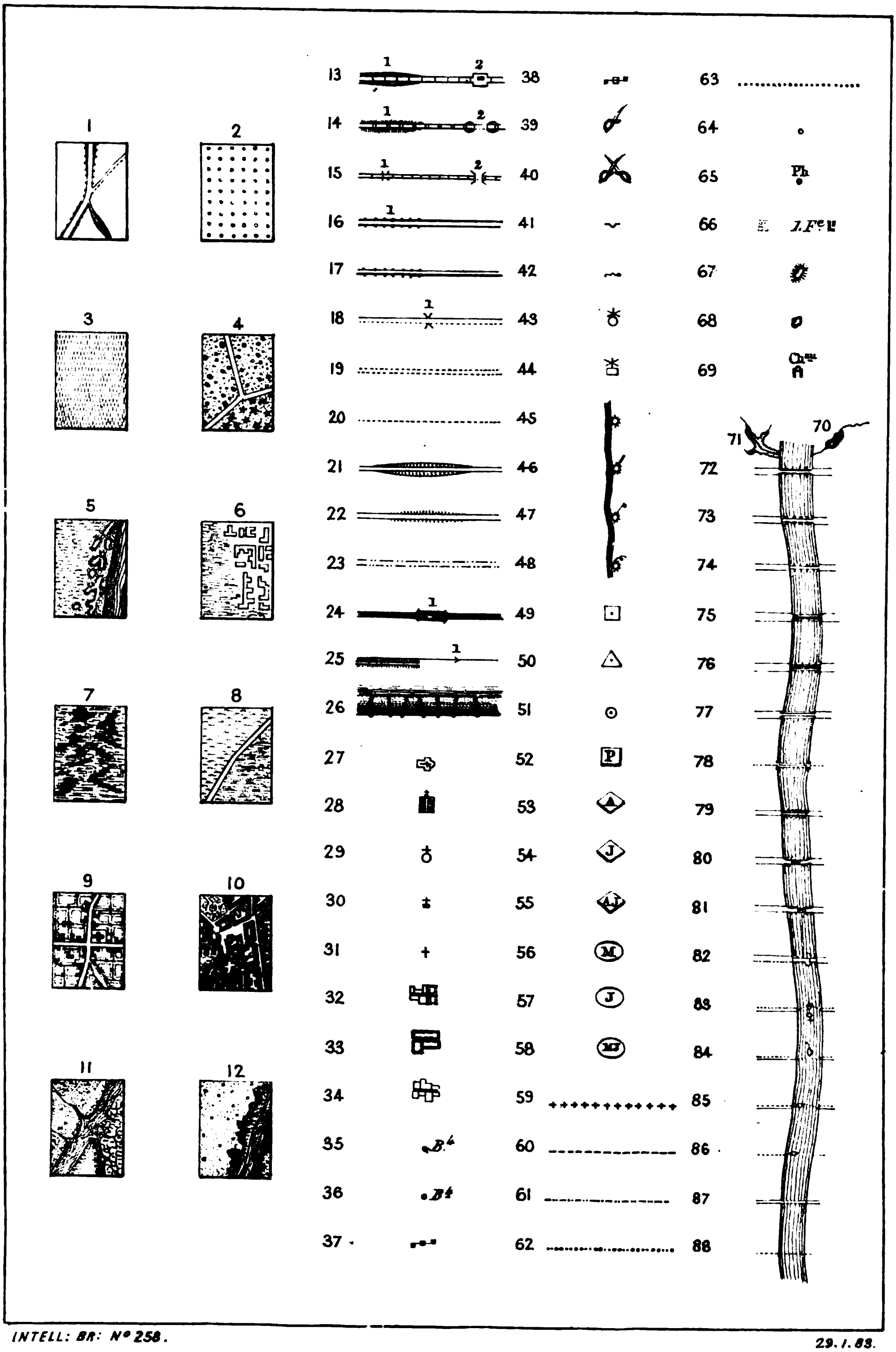
29. 1. 83

Conventional Signs on the Map of Belgium

Pl. V.

$\frac{1}{40.000}$

(See pages 35, 36 & 37.)



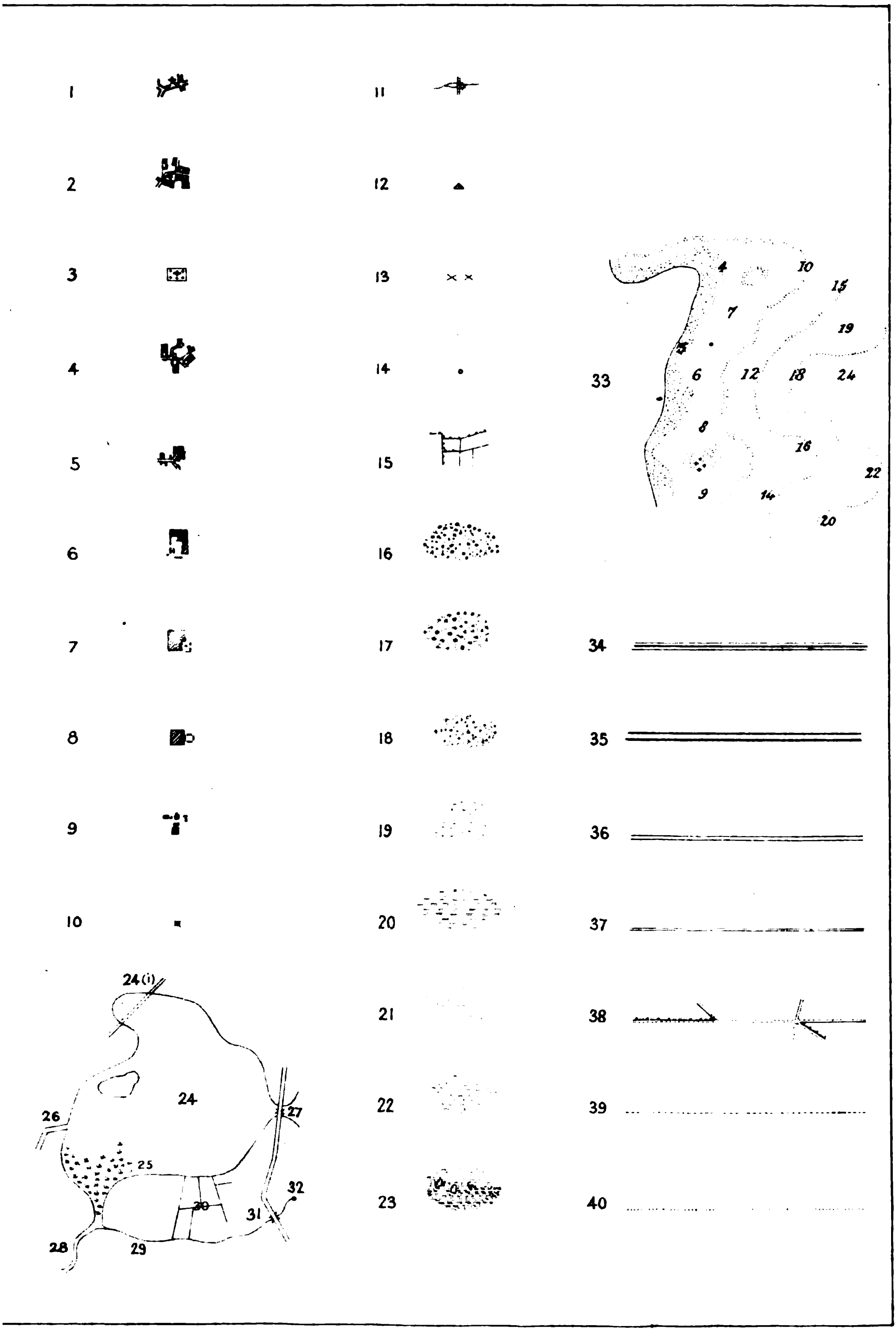
INTELL: BR: No 258.

29. I. 88.

Conventional Signs for the Topographical Map of Jutland.

$\frac{1}{40.000}$

(See pages 40 & 41)



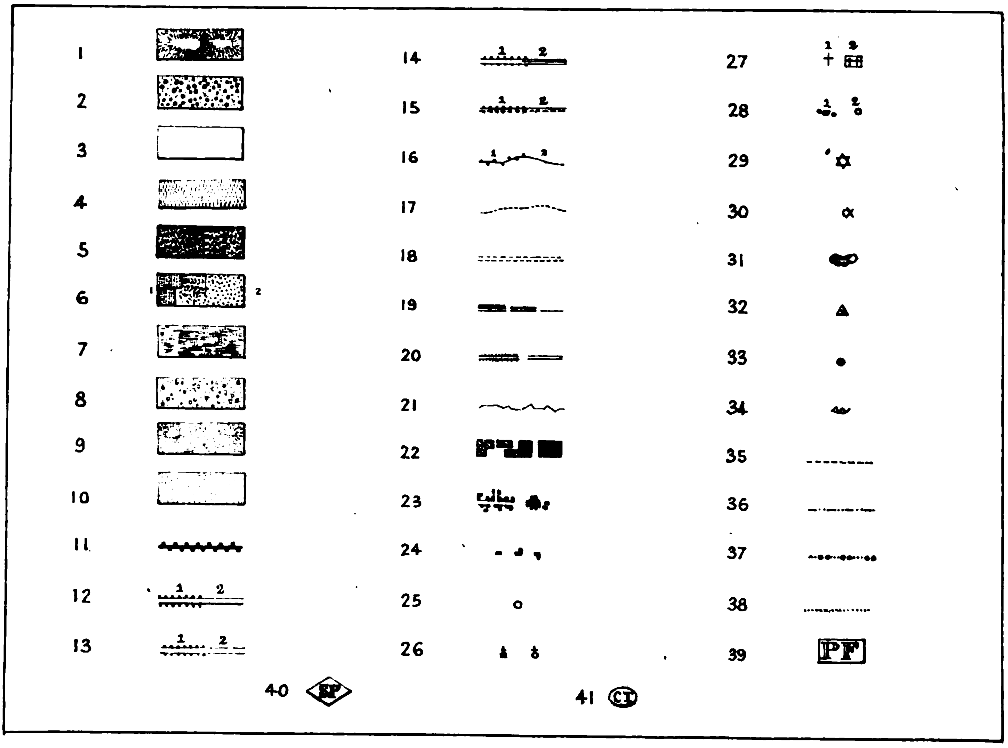
INTELL. BR. Nº 259

31. 1. 83.

Conventional Signs for the Staff Map of France. Pl. VII.

$\frac{1}{80\cdot000}$

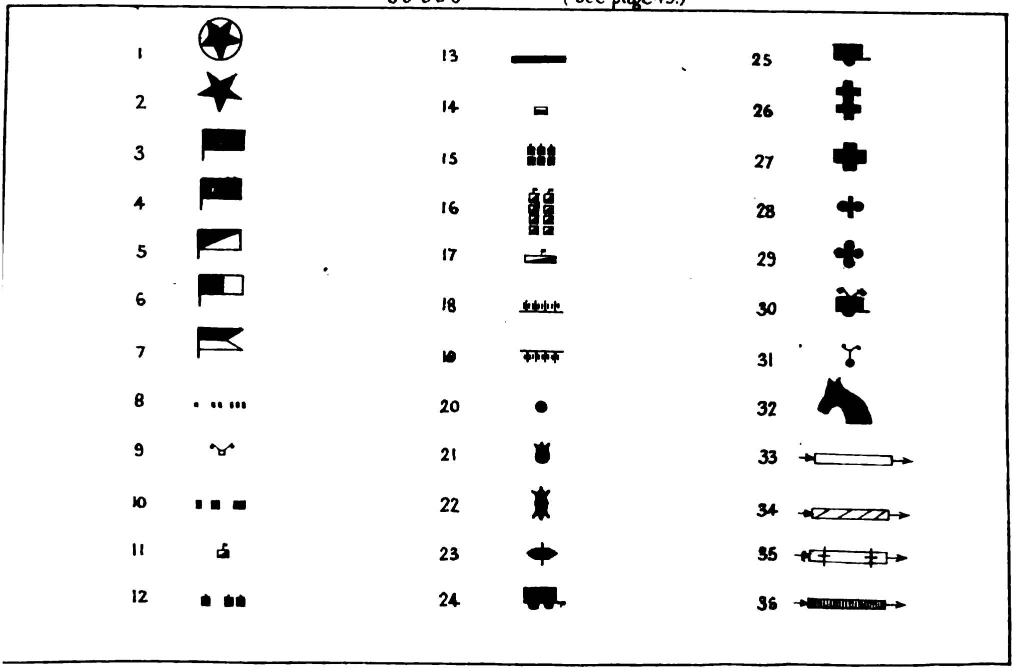
(See pages 47 & 48.)



Conventional Signs used to represent Troops &c upon Maps & Sketches.

(French.)

$\frac{1}{80\cdot000}$ (See page 49.)



INTELL. BR. No 260.

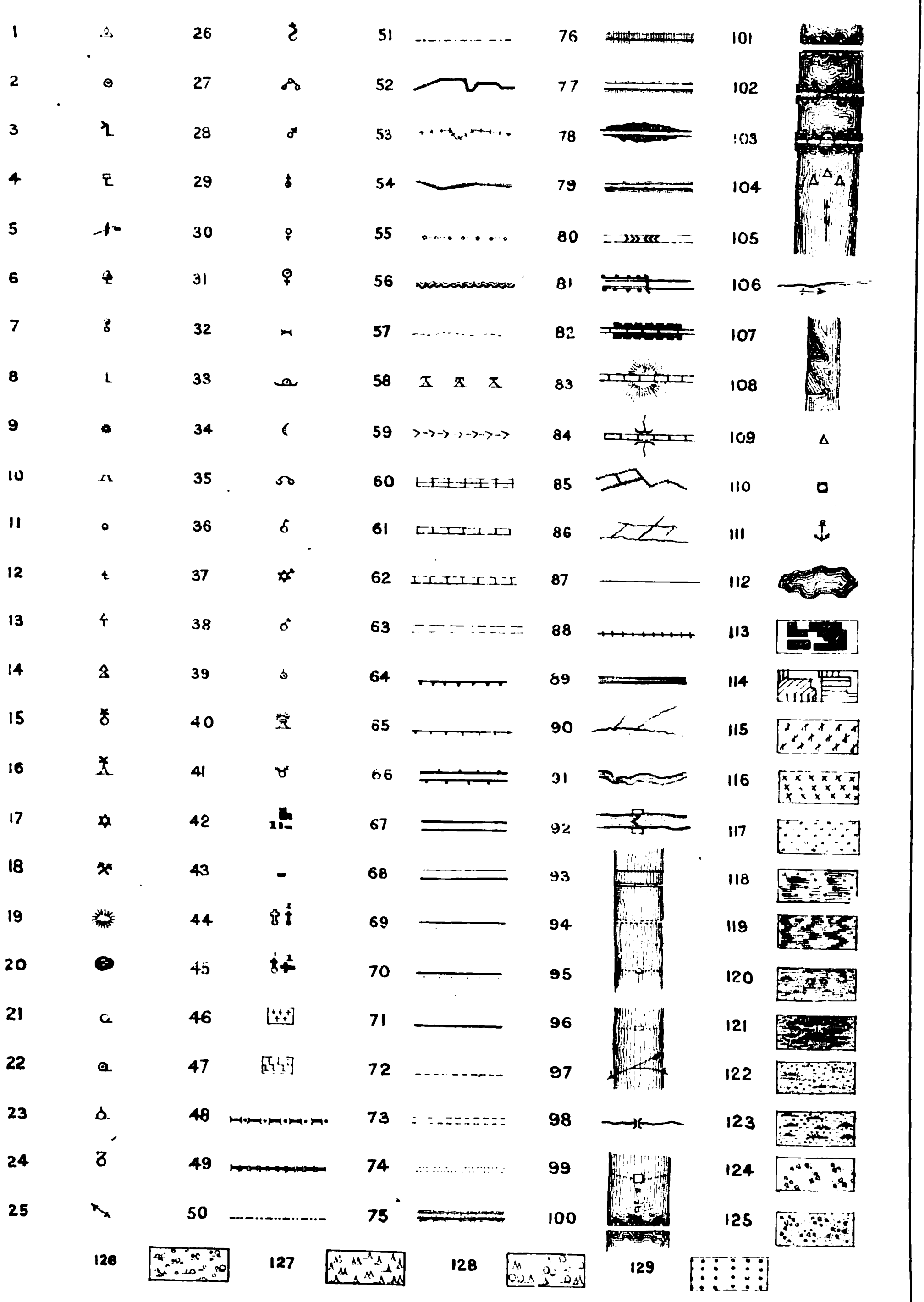
31. 1. 83.

Conventional Signs for Prussian Military Maps.

PL. VIII.

$\frac{1}{12,500}$ $\frac{1}{25,000}$ $\frac{1}{50,000}$.

(See pages 58 to 61.)



INTELL. BR. N°261.

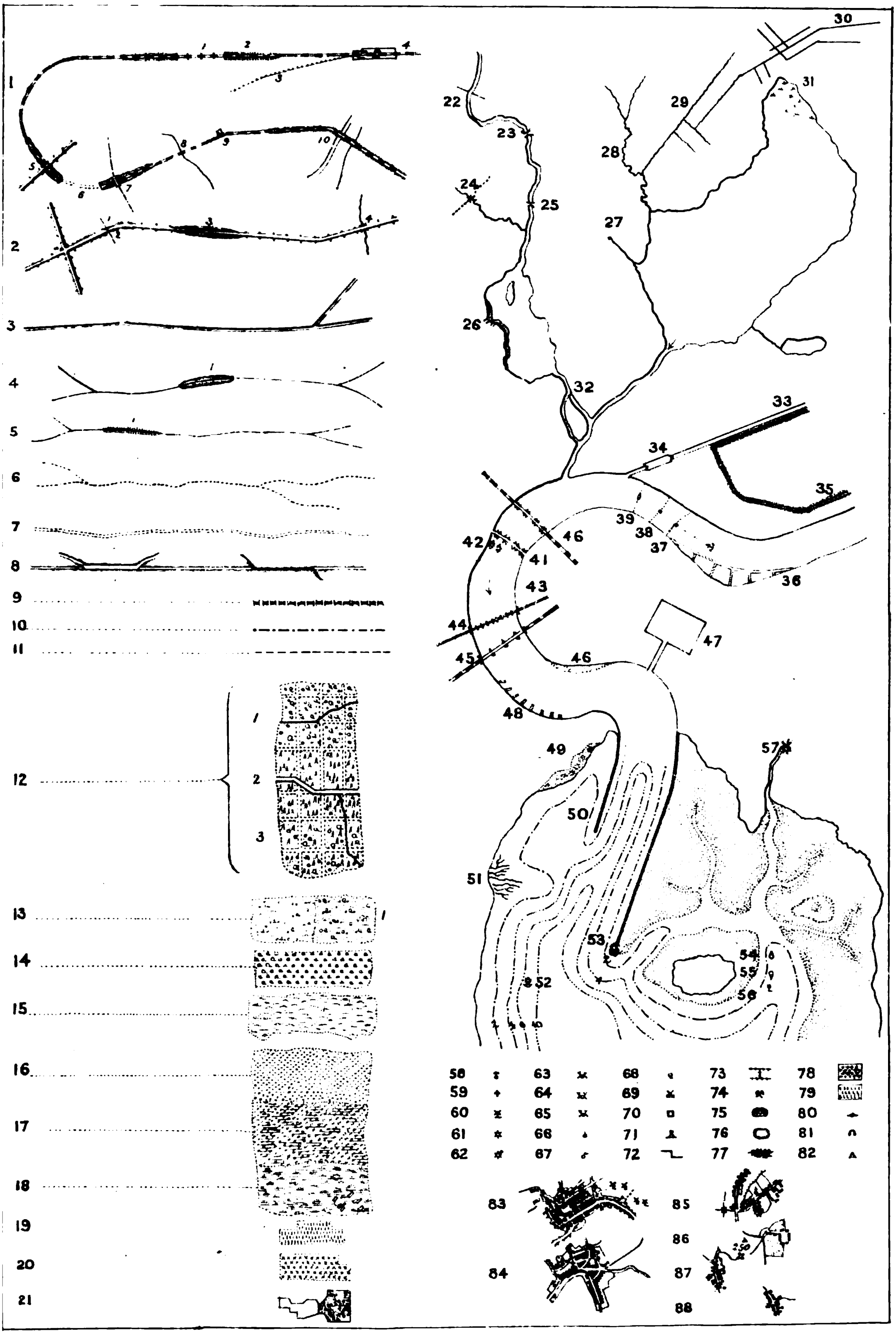
3.2.83.

Conventional Signs used on the Map of the German Empire

PL: IX.

$\frac{1}{100,000}$

(See pages 62 to 64.)



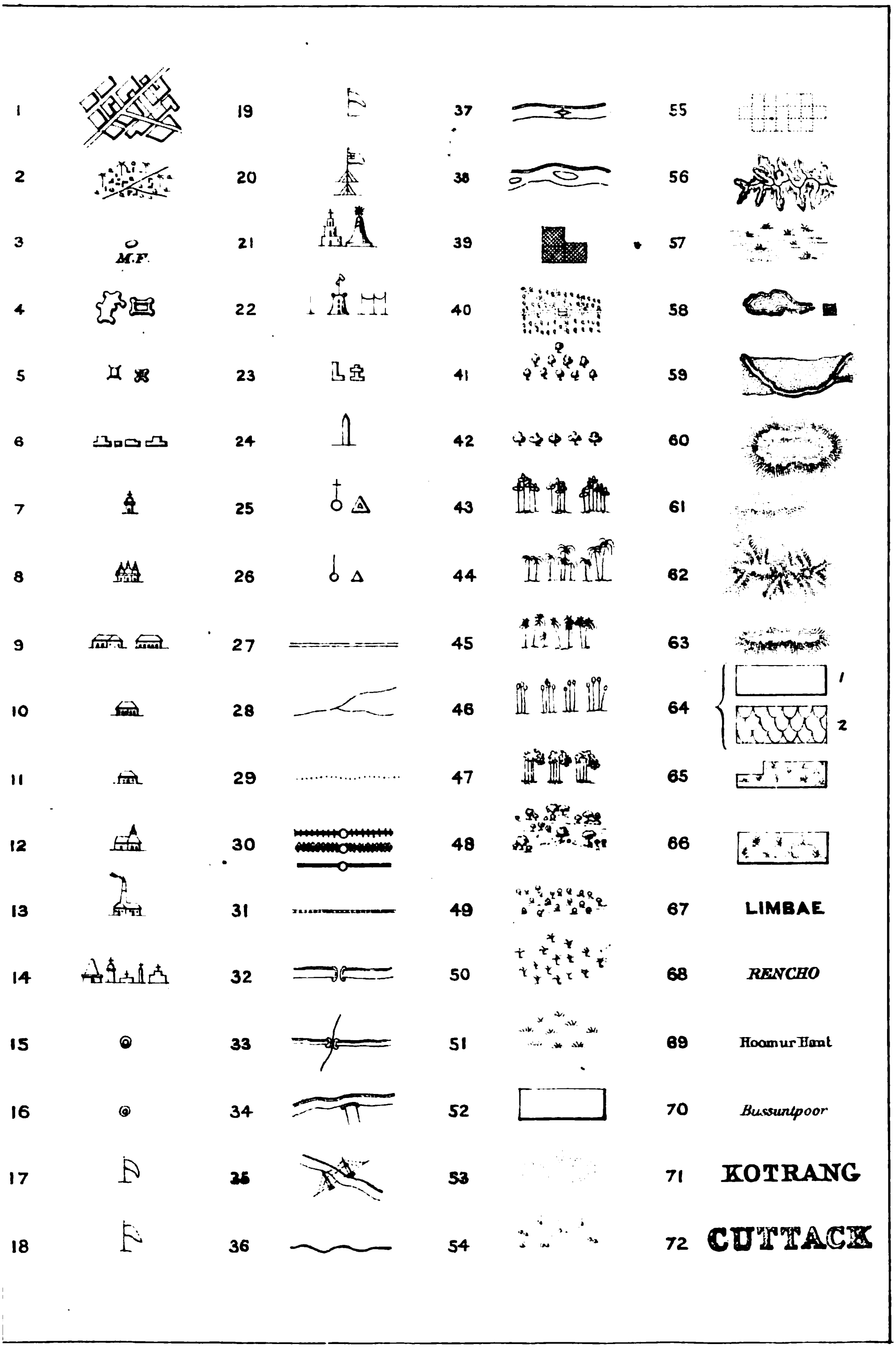
INTELL. BR: No. 262.

7.2.83.

Conventional Signs used on the Indian Surveys.

PL.X.

(See pages 73 & 74.)



INTELL:BR: No 263.

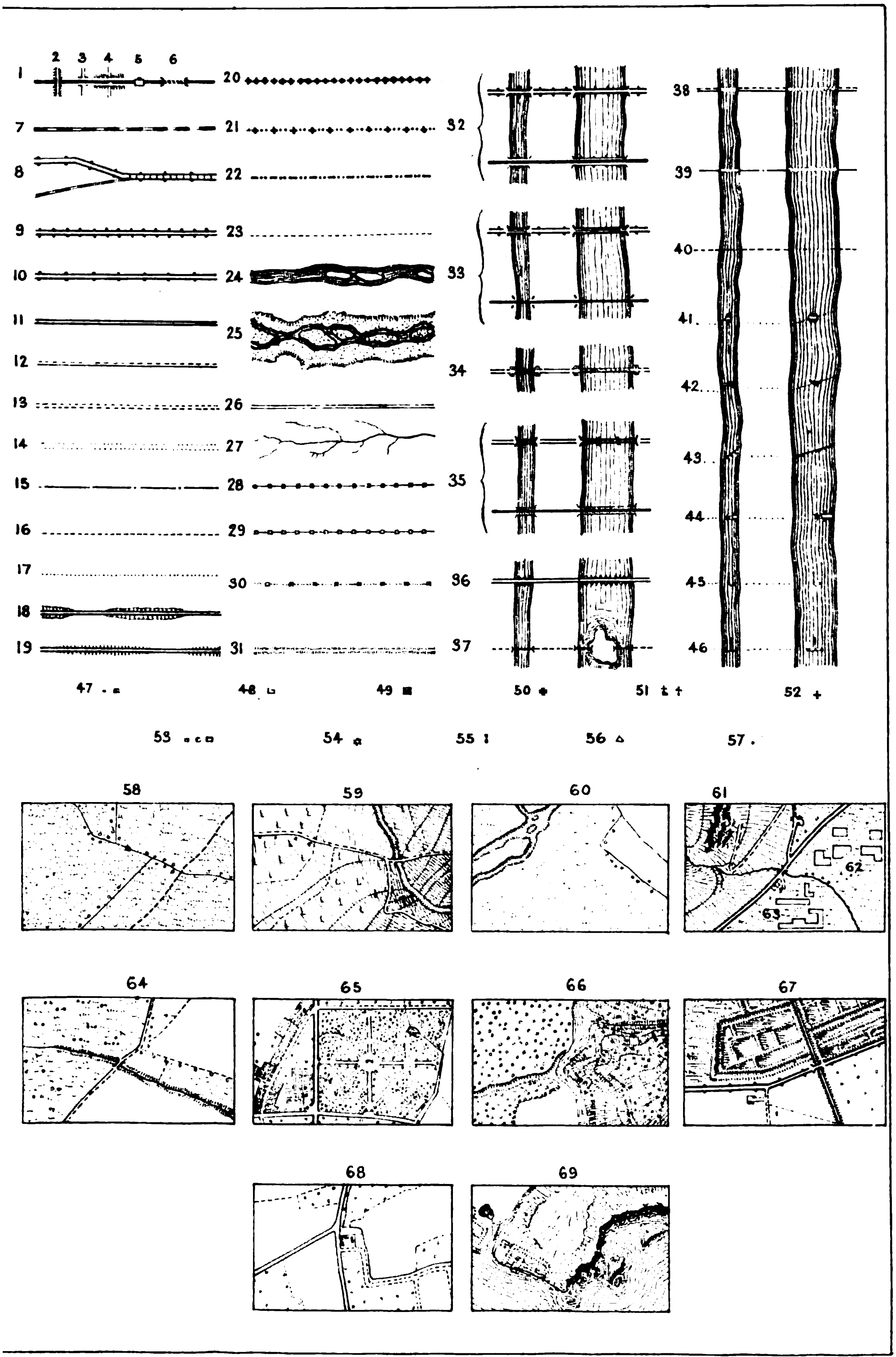
9.2.83.

Conventional Signs on Map of Italy.

Pl. XI.

$\frac{1}{100{,}000}$

(See pages 84 & 85.)



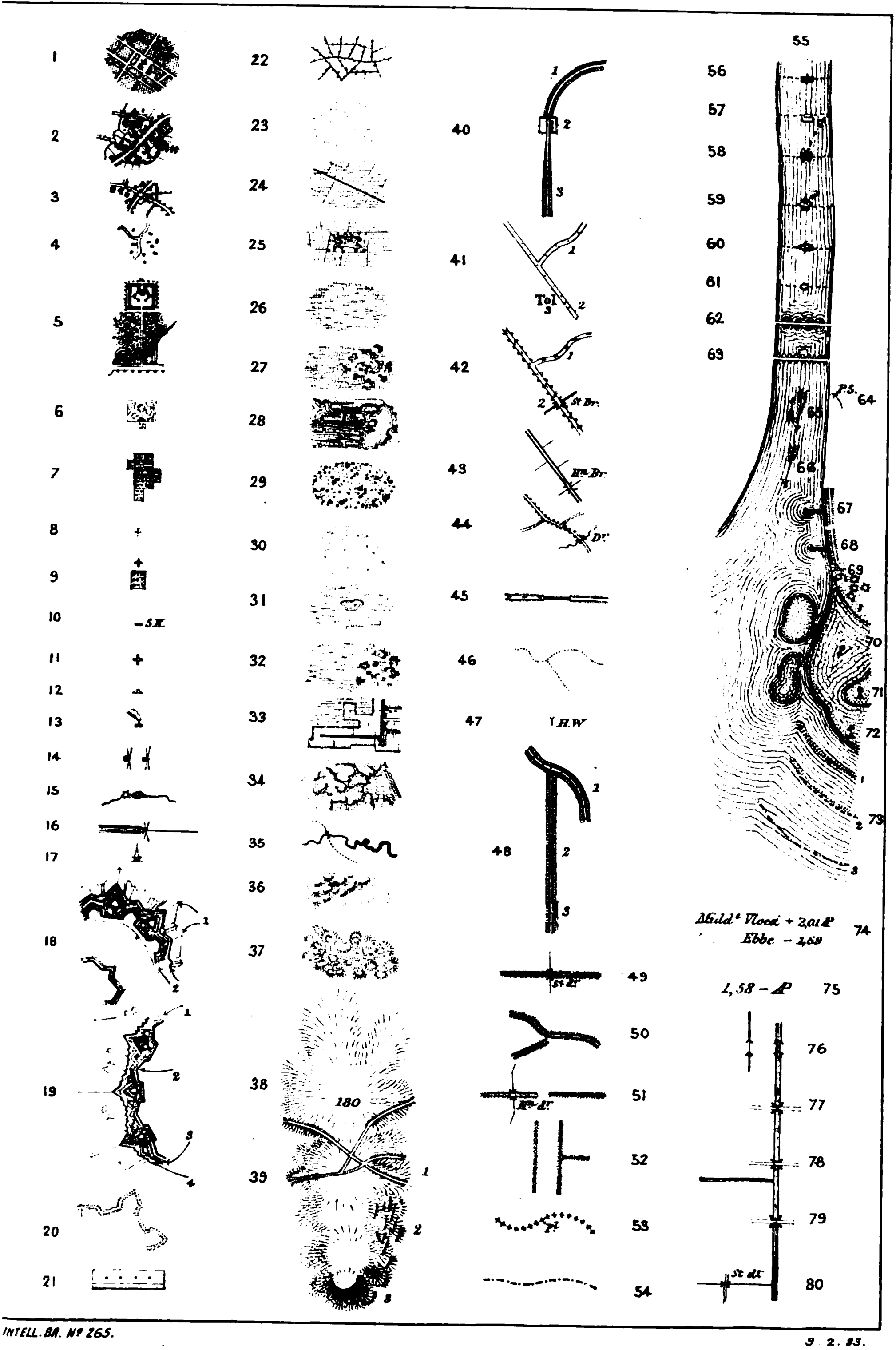
INTELL. BR. No 264.

9. 2. 83.

Conventional Signs on the Staff Map of the Netherlands.

$\frac{1}{50000}$

(See pages 89 to 91.)



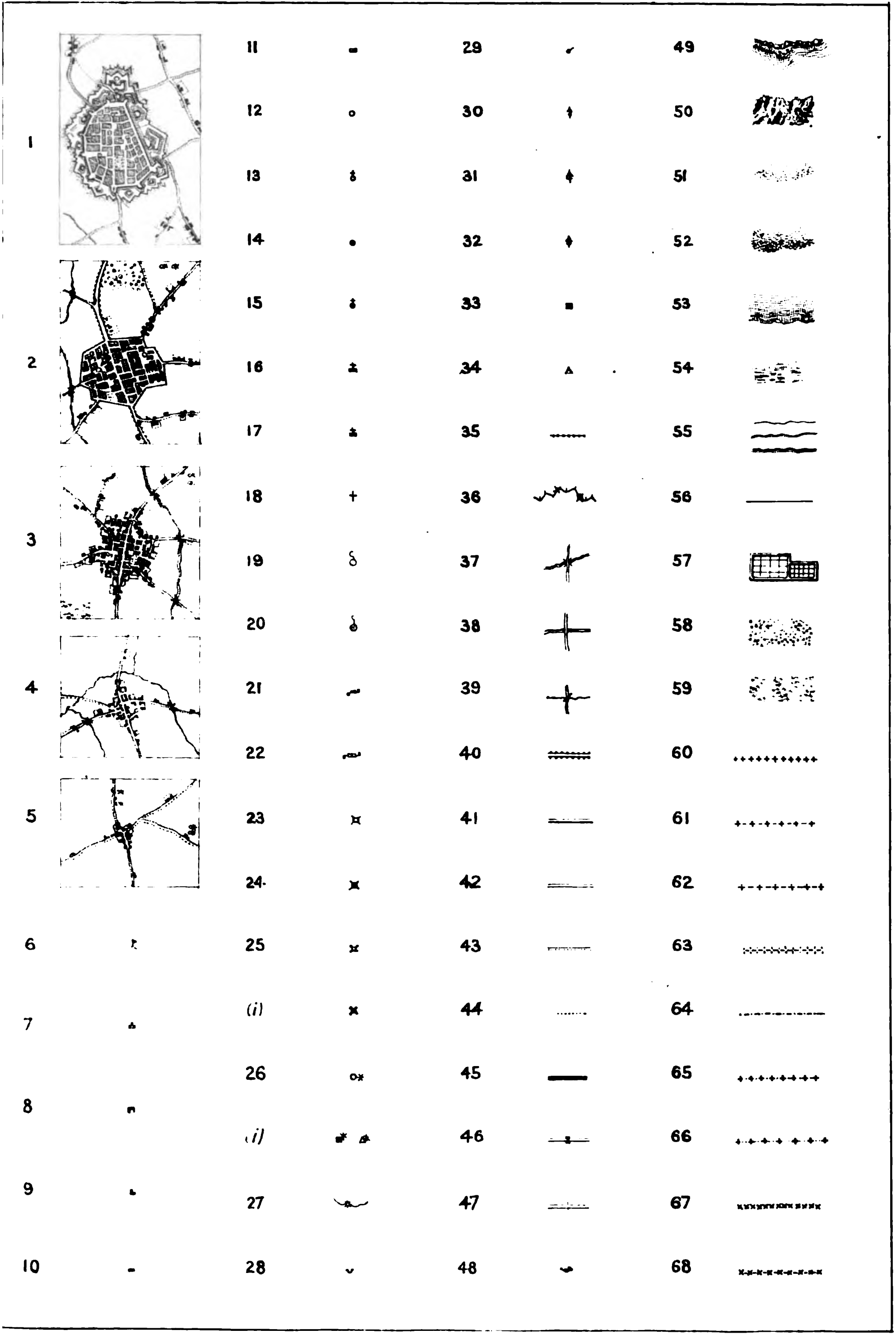
INTELL. BR. Nº 265.

9. 2. 93.

Conventional Signs used on the Map of Portugal

$\frac{1}{100,000}$.

(See pages 99 to 101.)



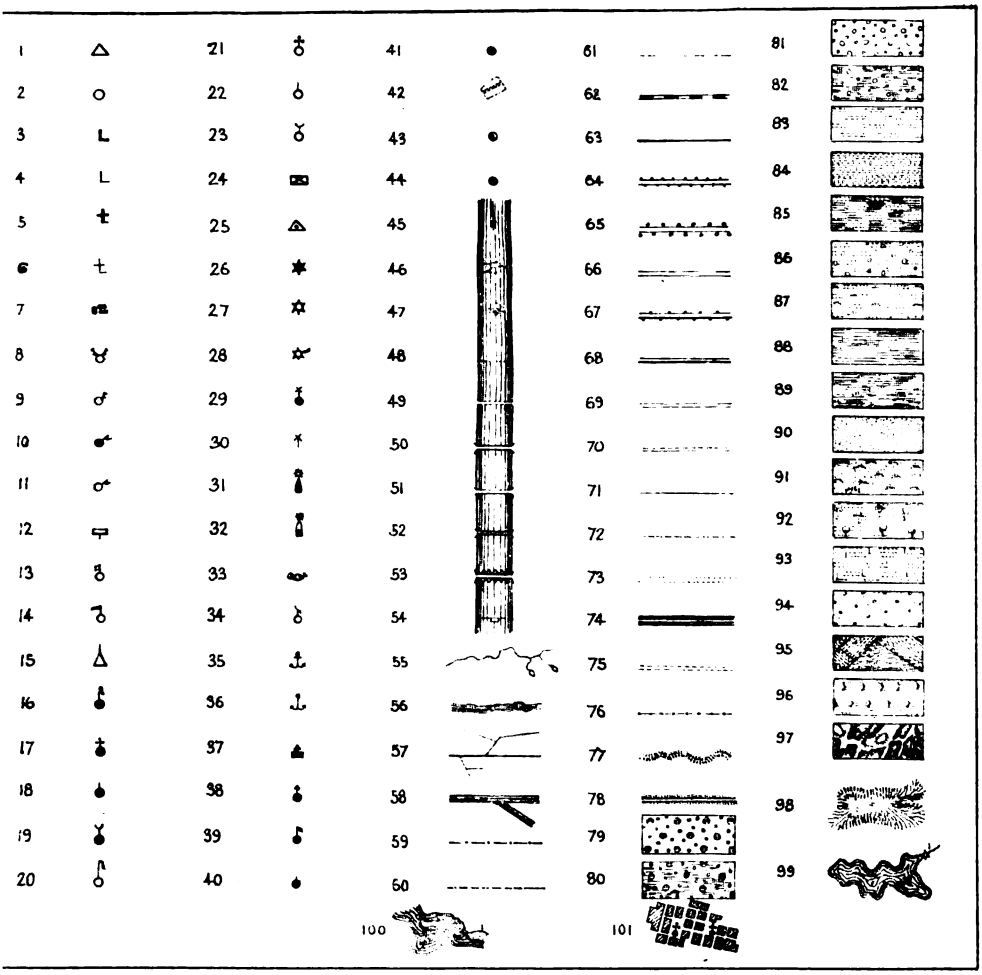
INTELL. BR: N° 267.

17. 2. 83.

Pl. XV.

Conventional Signs on the Topo: Mil: Maps of Russia.

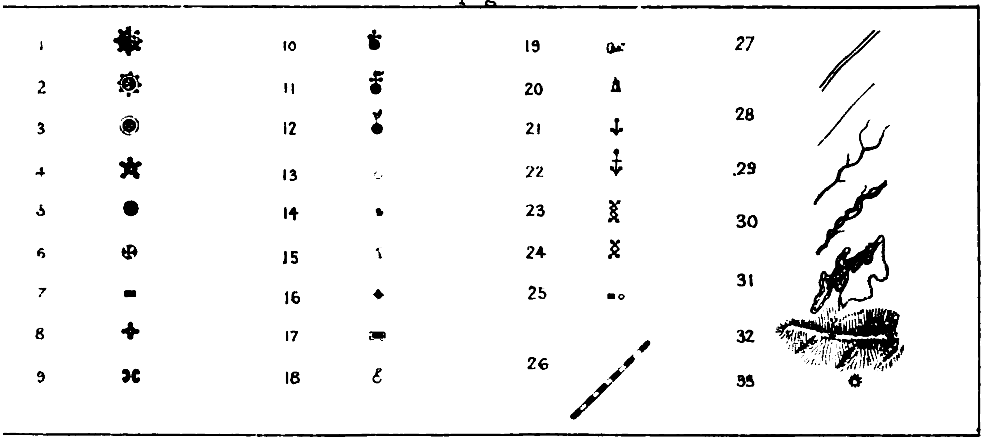
(See pages 107 to 109.)



Conventional Signs on the Map of Turkey in Asia &c.

$\frac{1}{840.000}$

See pages 109 & 110

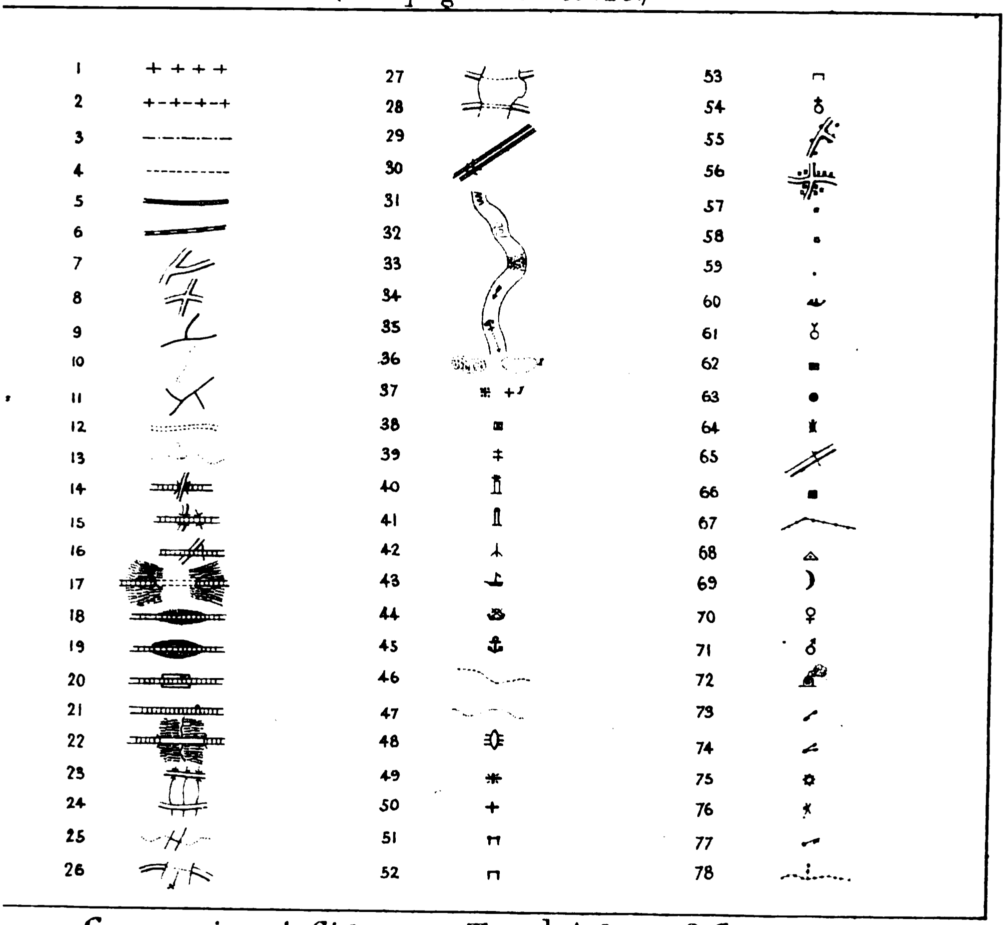


TELL. BR. Nº 268. 17.2.83.

Conventional Signs on the Map of Sweden.

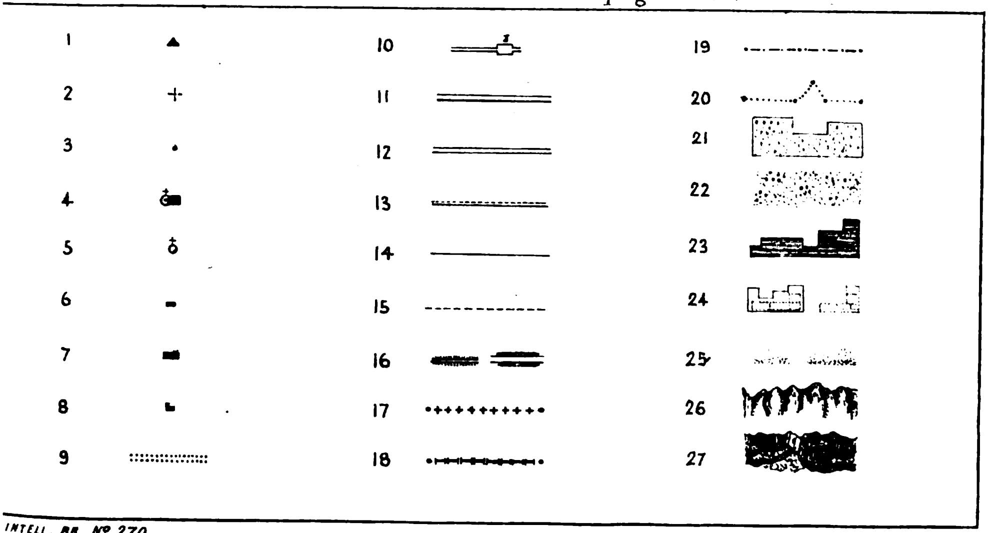
$\frac{1}{100,000}$

(See pages 124 to 126.)



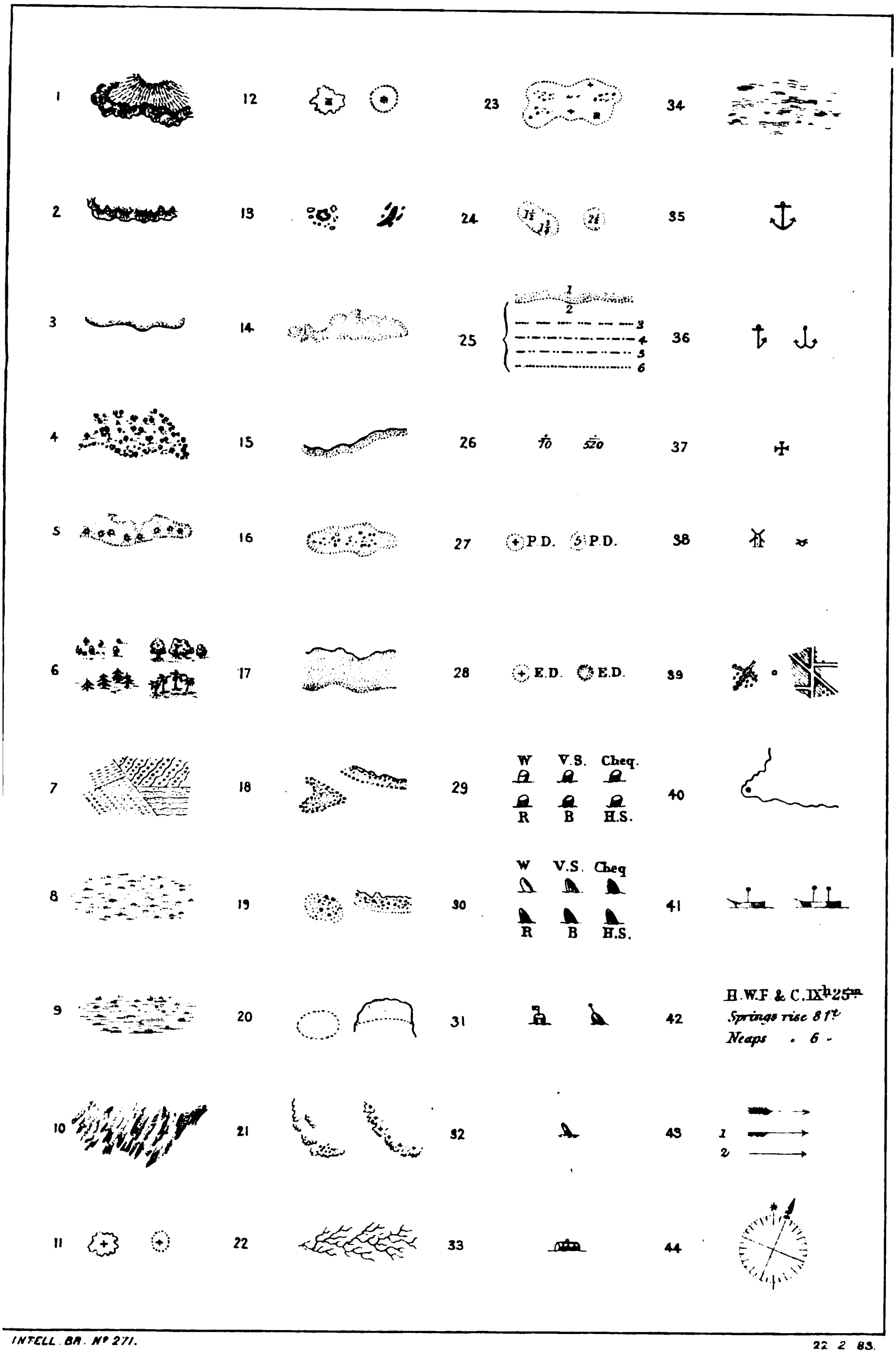
Conventional Signs on Topo^{l} Atlas of Switzerland.

$\frac{1}{25,000}$ & $\frac{1}{50,000}$. (See page 129)



Conventional Signs on the English Admiralty Charts. Pl. XVIII.

(See pages 134 to 136.)

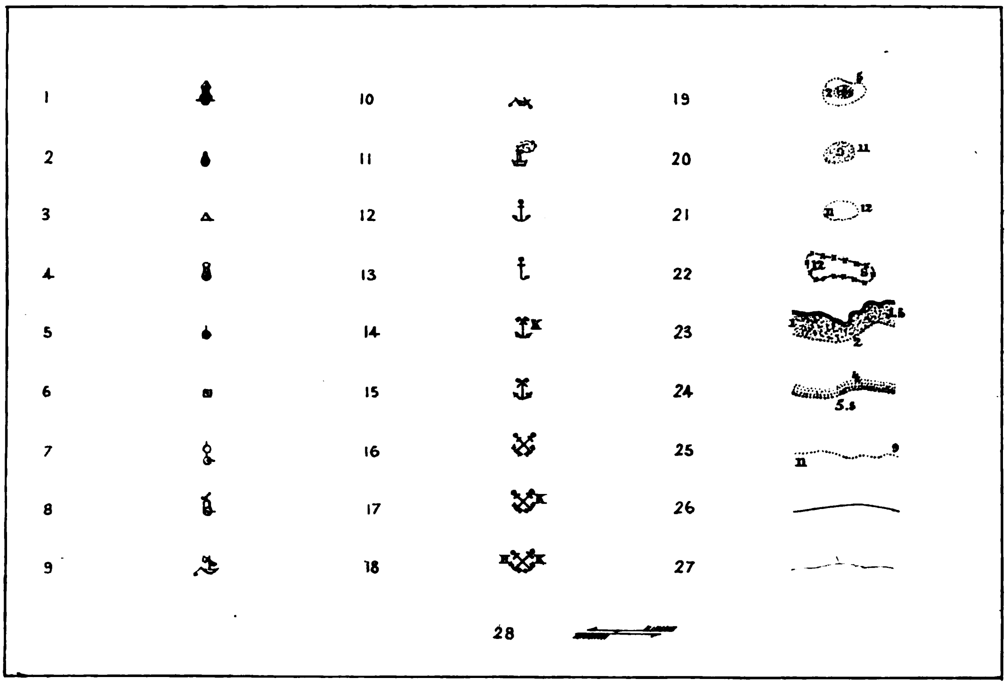


INTELL. BR. Nº 271.

22. 2. 83.

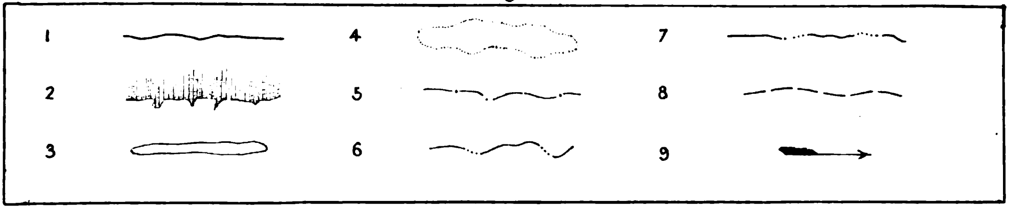
Conventional Signs on the Admiralty Charts, Austro-Hungary. Pl. XIX.

(See page 138.)



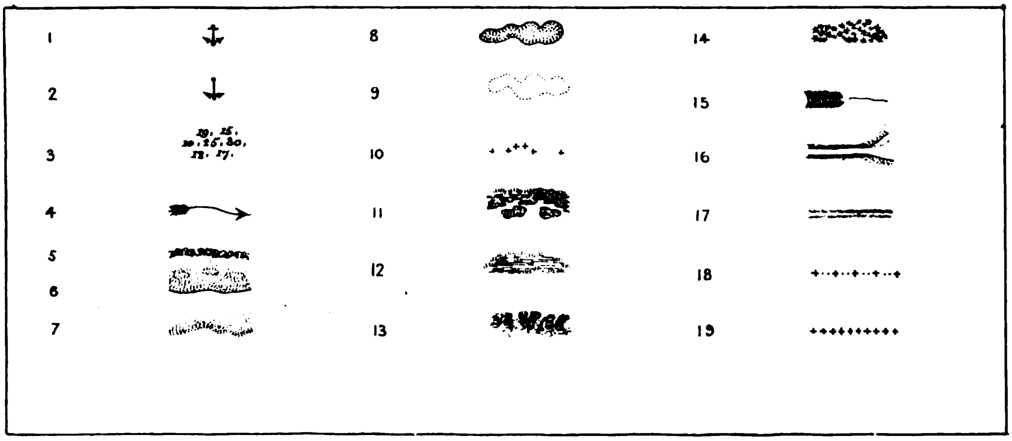
Conventional Signs on the Admiralty Charts, Germany.

(See page 142.)



Conventional Signs on the Admiralty Charts, Italy.

(See page 143.)



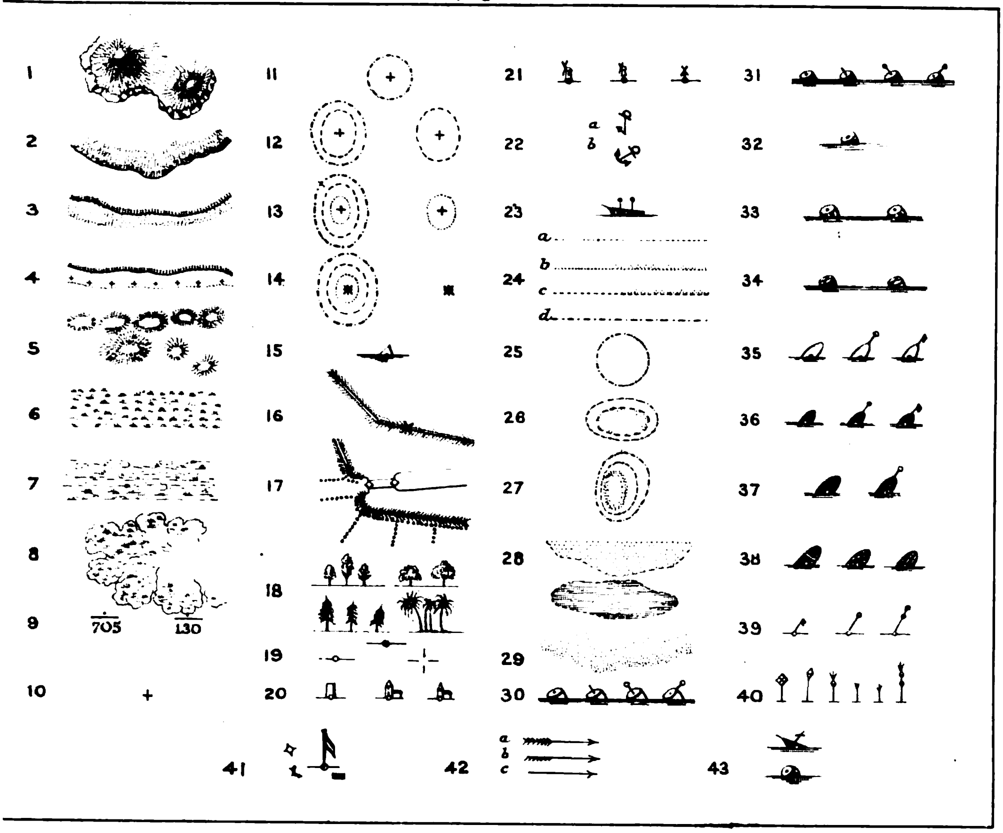
INTELL. BR. Nº 272

22.2.83.

Pl. XX.

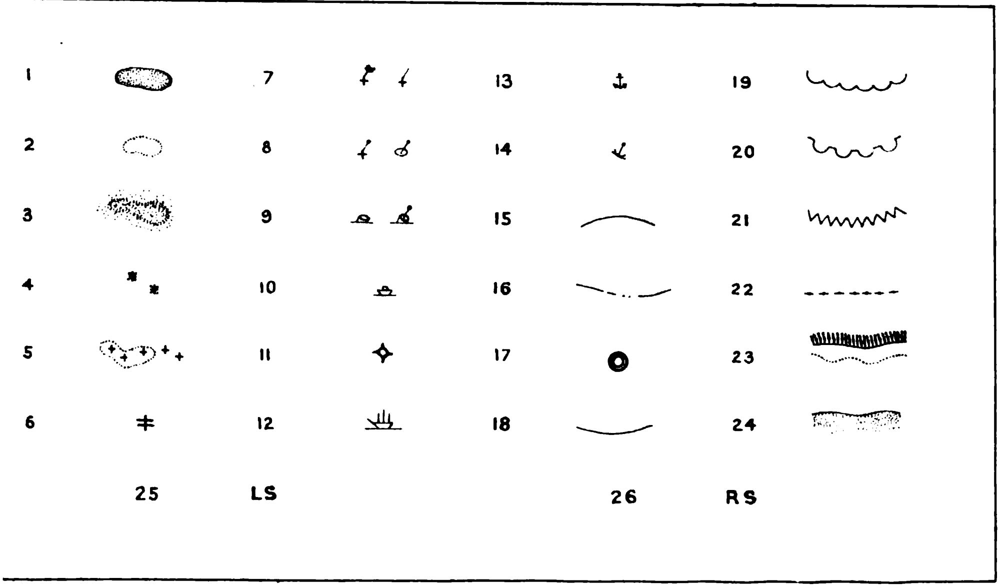
Conventional Signs on the Dutch Admiralty Charts.

(See pages 144 & 145)



Conventional Signs on the Norwegian Admiralty Charts.

(See page 148)

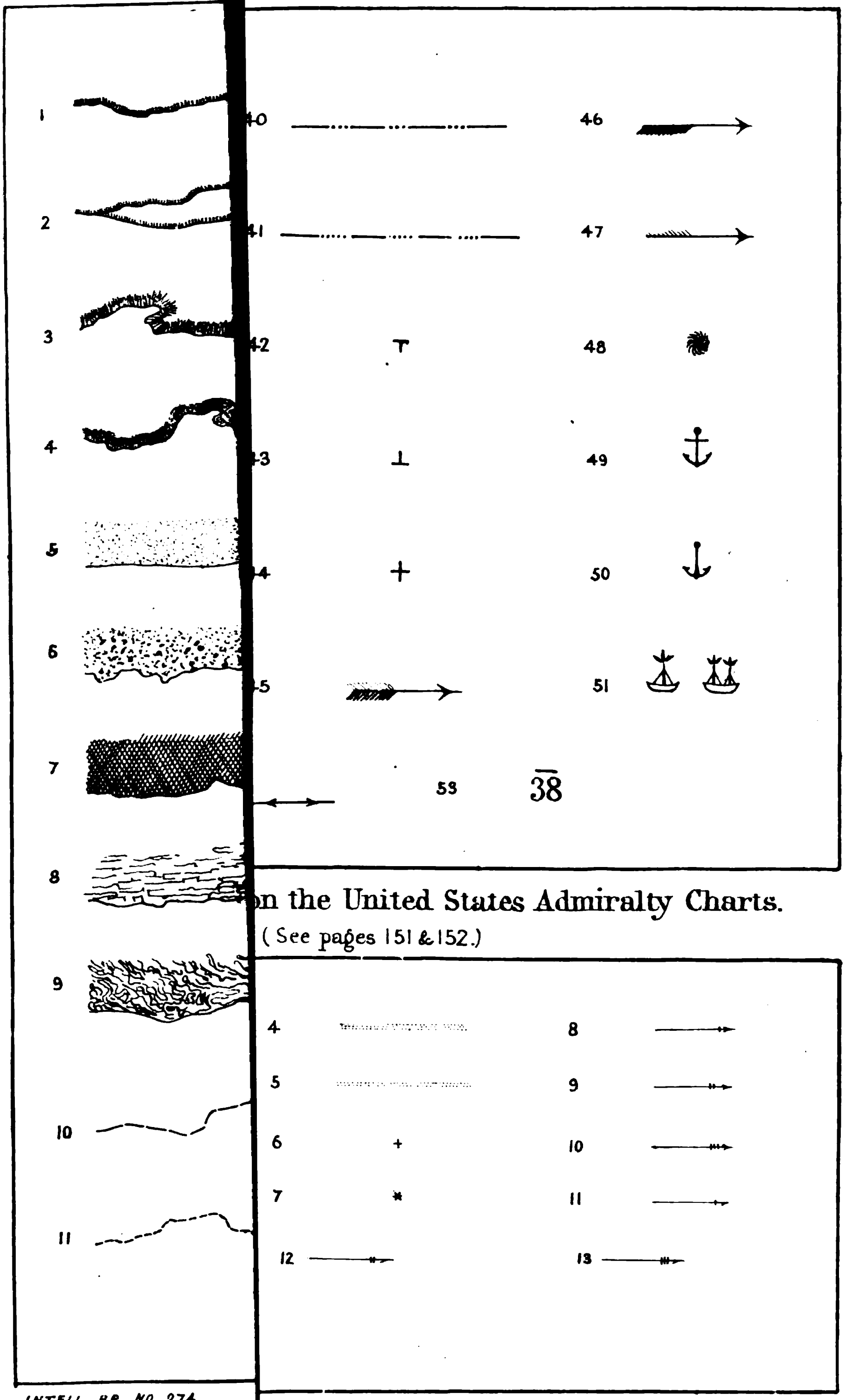


INTELL: BR. No 273.

27. 2. 02.

Charts.

PL. XXI.



n the United States Admiralty Charts.

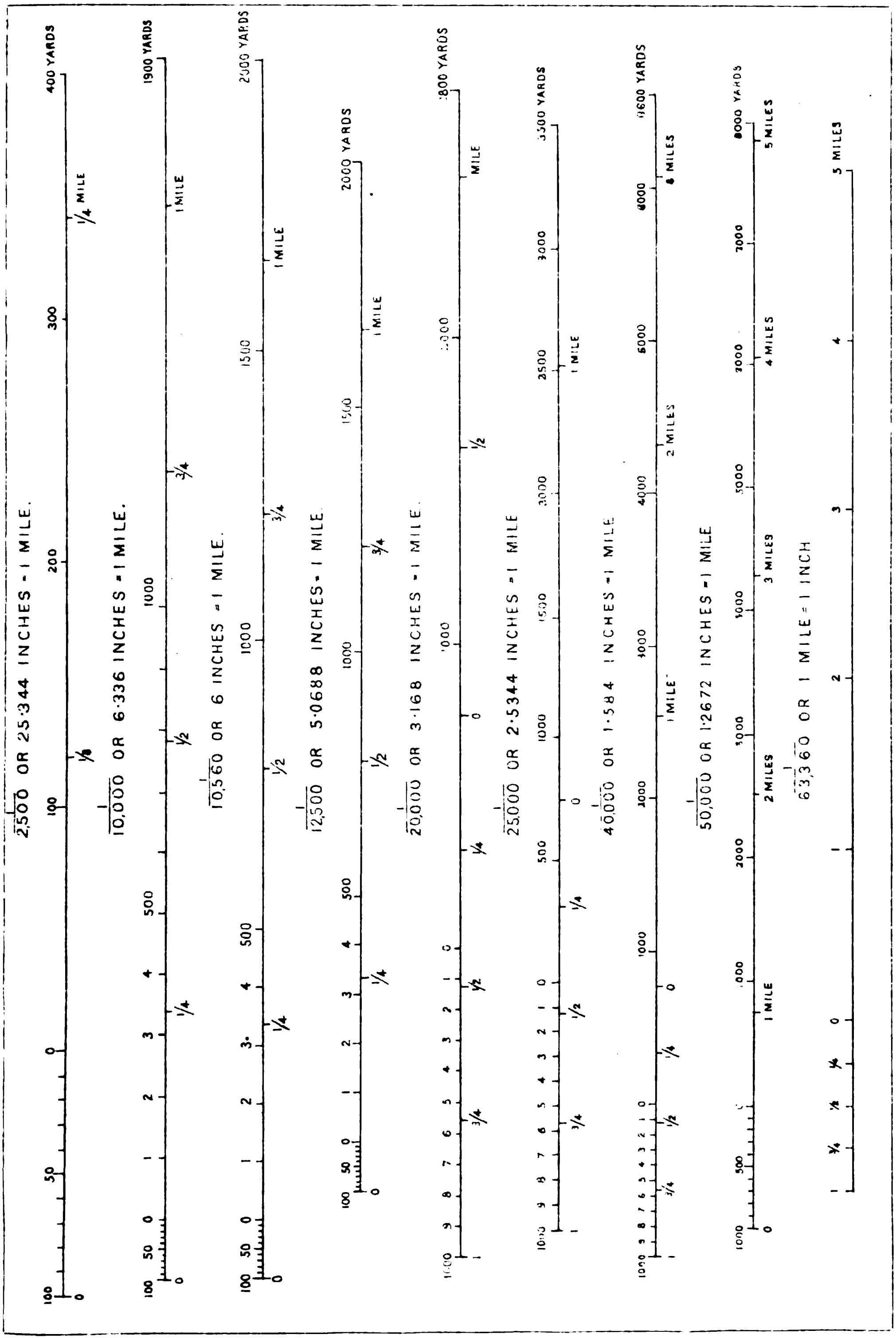
(See pages 151 & 152.)

INTELL. BR. NO. 274.

27. 2. 83.

Pl. XXII.
a.

Scales of English Statute Miles
for the
Principal Representative Fractions.



1/2,500 OR 25·344 INCHES = 1 MILE.
400 YARDS
1/4 MILE
1/10,000 OR 6·336 INCHES = 1 MILE.
1900 YARDS
1 MILE
1/10,560 OR 6 INCHES = 1 MILE.
2000 YARDS
1 MILE
1/12,500 OR 5·0688 INCHES = 1 MILE
2000 YARDS
1 MILE
1/20,000 OR 3·168 INCHES = 1 MILE.
1800 YARDS
MILE
1/25,000 OR 2·5344 INCHES = 1 MILE
3500 YARDS
1 MILE
1/40,000 OR 1·584 INCHES = 1 MILE
6600 YARDS
3 MILES
2 MILES
1 MILE
1/50,000 OR 1·2672 INCHES = 1 MILE
8000 YARDS
5 MILES
4 MILES
3 MILES
2 MILES
1 MILE
1/63,360 OR 1 MILE = 1 INCH
5 MILES

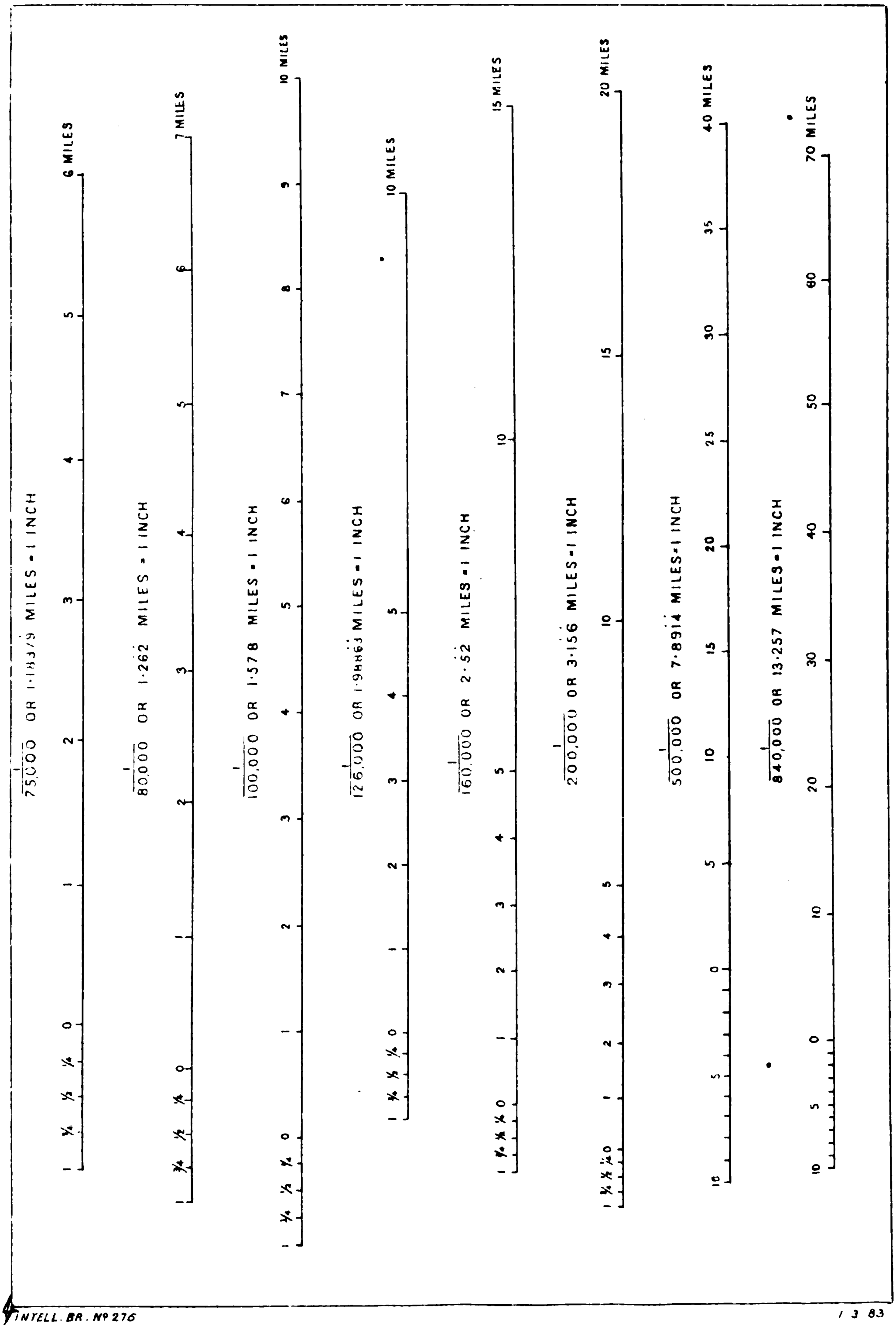
INTELL. BR. Nº 275

1. 3. 83

PL. XXII. b.

Scales of English Statute Miles
for the
Principal Representative Fractions

(continued)


1/75,000 OR 1·18379 MILES = 1 INCH
6 MILES
1/80,000 OR 1·262 MILES = 1 INCH
7 MILES
1/100,000 OR 1·578 MILES = 1 INCH
10 MILES
1/126,000 OR 1·98863 MILES = 1 INCH
10 MILES
1/160,000 OR 2·52 MILES = 1 INCH
15 MILES
1/200,000 OR 3·156 MILES = 1 INCH
20 MILES
1/500,000 OR 7·8914 MILES = 1 INCH
40 MILES
1/840,000 OR 13·257 MILES = 1 INCH
70 MILES

INTELL. BR. No 276

1 3 83

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3 0112 068019170